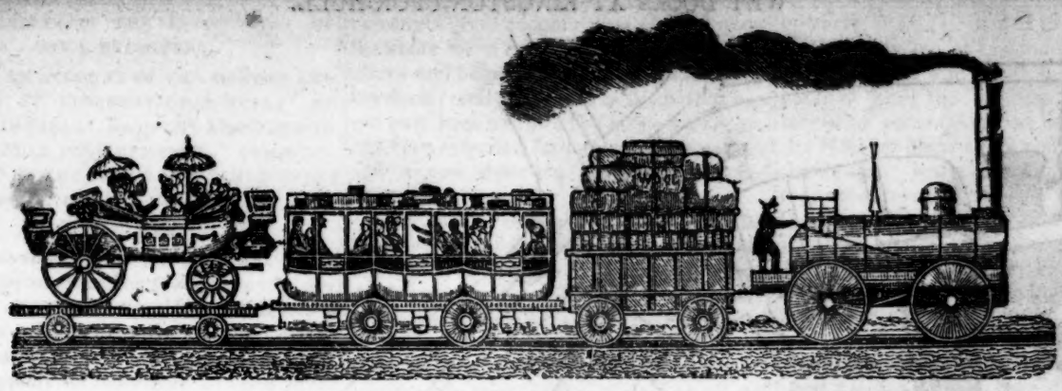

AMERICAN RAILROAD JOURNAL,
AND ADVOCATE OF INTERNAL IMPROVEMENTS.

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AMERICAN RAILROAD JOURNAL.

NEW-YORK, JULY 8, 1837.

The following article from the Long Island Star, should be read by every young man who would be the architect of his own fortune.

THE CERTAIN REWARDS OF INDUSTRY.—We remember reading some time since, the memoirs of a certain bookseller, named *Lackington*, who lived in London. He was early apprenticed to a shoemaker, and industriously served out his apprenticeship. He pursued this vocation for some time afterwards, working at various places for a bare subsistance, and at length married a wife as poor as himself. They endured sickness and privation. At length Lackington, who had some penchant for bookselling, opened a shop in an obscure part of London, with a few books on divinity, and at the same time wrought at his trade. He made a few pounds, and gaining confidence, entered upon bookselling altogether. He continued to grow prosperous. His store at length became immense, he rode in his coach, and died exactly at the age of three score and ten.

The story of Lackington may be of much use to society.—It resembles in some points that of our countryman Franklin, but still Lackington was a very different man from the American philosopher. He never would have encountered any hazard in the pursuit of science. "His soul proud science never taught to stray." He kept plodding onward, in the accustoned rotine of his business, and leaves his history as an example of the benefits of quietly sticking to the shop.

Of late years with us, as with the olden nations, the pursuits of humble industry seem to have been despised. Many have been led to look to sudden means of obtaining wealth, and have turned from the beaten track of soil, to untrial but more attractive paths. Some have been lost and many bewildered, and those who are able to find their way back to the quiet duties of useful stations, will not soon be likely to violate the rules of prudence, for the sake of trying ambitious experiments.

Even in countries where aristocratic distinctions prevail, great respect is paid to men of substantial character, who can show that by labor, and patience, and self-denial, at the outset, they have at length conquered fortune and acquired the control of wealth. Such individuals, too, feel the comfort of that characteristic of mind which is called *independence*. They have wrought for themselves—they have risen by their own exertion—they sustain themselves upon their own wings. Such independence should be the common exertion.

It is becoming too general with the people of this country, to despise the occupations which require labor. Men would have their children tenth-rate professional men, or *mere nullities*, rather than turn their minds to useful trades. We need not enforce the principle, that it is better to encourage humble desires and more useful aspirations. If the mind, after the body has been disciplined and suited to habits of patient toil, rises to a different and higher range of duties, the humility from which it arose, but adds to the pride and elevation of its soaring.

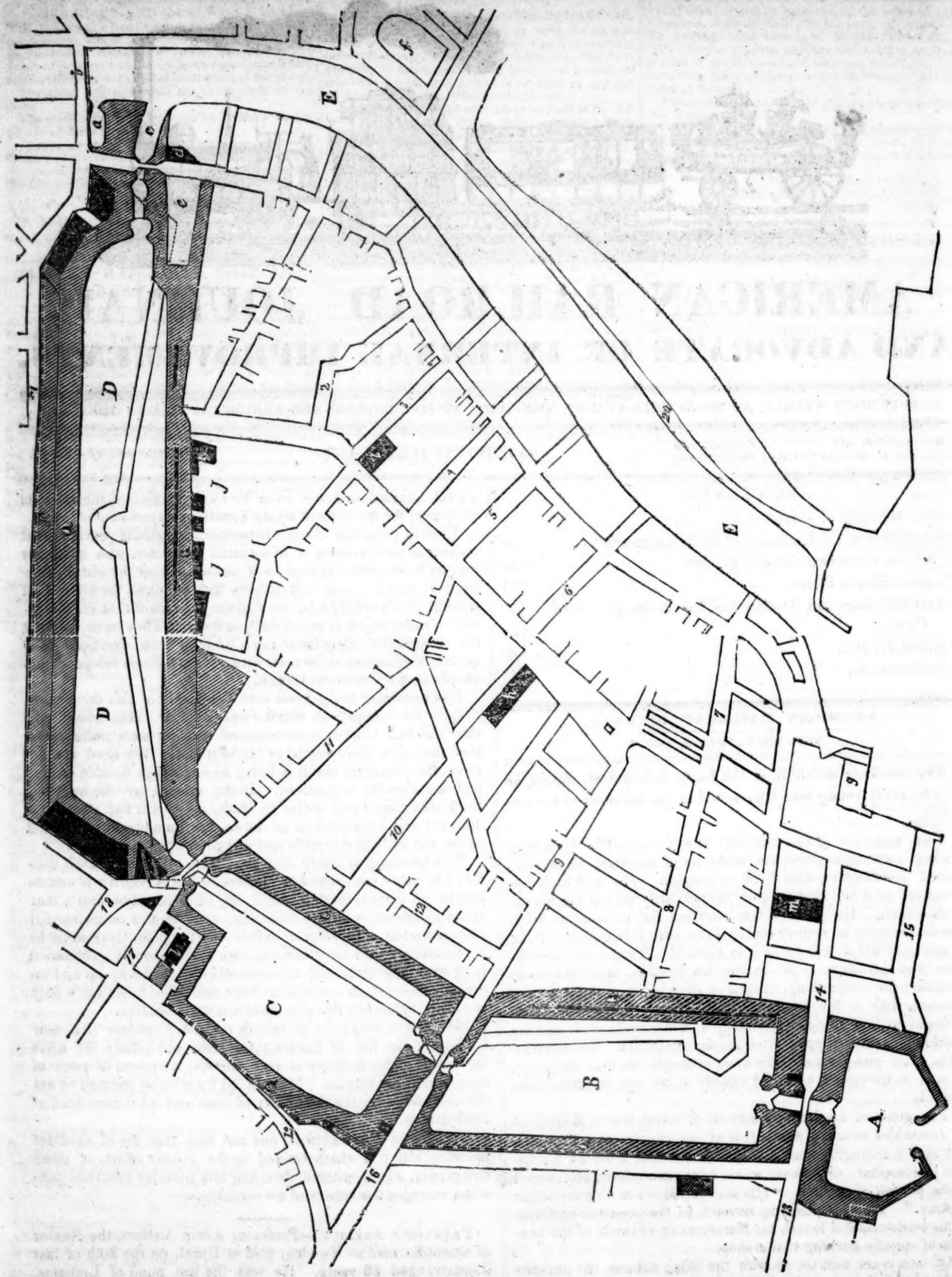
The great aim of every man should be, to render himself useful; and every man who has the steadfastness which will enable him to go perseveringly through the labor of a few years, may attain competency almost with the certainty of a mathematical demonstration. In order to follow out the plan, there must be a resistance of all temptation to turn aside, a ready submission to unavoidable disasters, a continual effort to build up and increase—in brief, an unyielding desire and effort to do one's duty to society, in the regular pursuit of a use ul vocation.

We think it would be of benefit to many readers if a new edition of the life of Lackington, were published; for while the moral of his industry is very forcible, the moral of some of his errors is not less so. He suffered from being induced to act the politician—he felt the effects of time and spirit sacrificed at conventicles.

The life of FRANKLIN is one not less than his of *constant industry*, but it is characterized by the further efforts of mind and genius, which, without diverting him from his practical pursuits, enlarged the sphere of his usefulness.

PROFESSOR AZELIUS.—Professor Adam Azelius, the Nestor of scientific men in Sweden, died at Upsal, on the 30th of last January, aged 86 years. He was the last pupil of Linnæus, and was celebrated for his travels in Asia and Africa. His brothers, John and Peter, the first devoted to chemistry, and the second to medicine, are both distinguished for their talents, and have, for nearly half a century, occupied chairs in the University of Upsal.—[Athenæum.]

WET DOCKS AT KINGSTON-UPON-HULL.



A, Basin ; B, Humber Dock ; C, Junction Dock ; D D, Old Dock ; E E, the Old Harbor ; F, Timber Yards ; J J, Warehouses ; Q Q Q Q Q, Quays ; a, Dry Dock ; b, New Bridge ; d, Dock House ; e, Bonding Dock ; f, Pond ; g, Ship Yard ; h, Church ; i, St. Mary's ; 1, Salt House Lane ; 2 George Yard ; 3, Chapel Lane ; 4, Bishop Lane ; 5, Seale Lane ; 6, Church Lane ; 7, Blackfriars Gate ; 8, Blanket Row ; 9, Myron Gate ; 10, Postern Gate ; 11, Whitefriars Gate ; 12, Dagger Lane , 13, New Road ; 14, Wellington-street ; 15, Nelson-st. ; 16, Castle-st. ; 17, Carr Lane ; 18, Waterworks Lane ; 19, Waterhouse Lane ; 20, Garrison Road.

TRANSACTIONS OF THE INSTITUTION OF CIVIL ENGINEERS.

XXVII. AN ACCOUNT OF THE HARBOR AND DOCKS AT KINGSTON-UPON-HULL. BY MR. TIMPERLEY, RESIDENT ENGINEER TO THE HULL DOCK COMPANY. COMMUNICATED BY THE PRESIDENT, JAMES WALKER, ESQ. F. R. S., L & E.

THE OLD HARBOR.

The river Hull, according to Mr. Tickell, the historian of the town, formerly discharged itself into the Humber between Drypool and Marfleet, and that part of the present river usually called the Old Harbor, was originally no more than an open drain cut by Lord Sayer of Sallon, for the purpose of draining the country.

This harbor, from the north bridge to its junction with the Humber, was the original and, previously to the construction of the docks, the only port for the town; its direction is nearly north and south, its length from the bridge to the end of the Garrison Jetty, 2940 feet, and the average width within the staiths, at high water of spring tides, 165 feet; the area is therefore about eleven acres, and the depth is 22 feet.

As trade and commerce increased, the harbor became insufficient to contain all the vessels that frequented the port, many of which were therefore obliged to receive and deliver their cargoes whilst lying in the roads, by means of craft, and so crowded was it at times, that even up to the period of the Junction Dock being made, ships have been known to be twenty tides or more in passing from the Humber to the Old dock. But the crowded state of the harbor, and the consequent delay in getting to and from the quays, were not the only inconveniences; for, from its being an open tideway, all vessels drawing more than four or five feet water grounded every tide; so that damage was frequently sustained, particularly by such as were sharply built and deeply laden. Complaints were also made by the officers of the Customs from time to time, of the great risk and difficulty in collecting the duties, whereby, it was stated, the revenue suffered very materially, and this ultimately led to the formation of the Old dock.

It should also be observed, that for some hours before low water, the current is so strong as to be unnavigable for vessels against the tide, and those passing with the stream are frequently injured; the fall or declivity from the outer end of the Old dock basin to the harbor mouth, at low water spring tides, being in general from four to five feet, and sometimes more, and the velocity of the ebb at such times from three to four miles an hour.

Before the Old dock was begun, transverse sections were taken of the harbor by Smeaton and Grundy, from which we find that the depth of water is now about the same as it was at that time, but the river is much narrower near its junction with the Humber; this diminution in the width has taken place since the Humber dock was made, from the free course of the tide, obstructed and retarded by the projection into river the of the quays and piers of the basin, causing a great accumulation of mud upon the shore for a considerable distance, both above and below the entrance to the Humber dock: and the mouth of the harbor has not only been narrowed by these works, but has been extended further into the Humber, and a new direction considerably to the westward given to it.

The harbor is scoured entirely by its back waters, of which the principal supply in summer is from the river Hull, which extends into the East Riding about twenty miles; and is navigable for vessels of fifty tons' burden; but in winter, the drainage from the extensive level of the Holderness and the low land on the west side of the river, has been, for a long time, a very powerful auxiliary in maintaining the depth.

For the convenience of vessels entering, two dolphins have been erected upon the Humber, to the east of the harbor mouth, the last in consequence of this part of the beach sanding up, as before noticed; and there is a jetty or small pier with the necessary mooring posts, and two transport buoys a little to the south of the dolphins. In former times a chain was stretched across the entrance of the harbor, and a small charge made for all vessels passing in or out, but this restriction and impost have been discontinued for many years.

On each side of the harbor, for nearly its whole length, there are staiths or platforms, fifteen feet wide, for loading and delivering vessels; they are private property, and in order not to obstruct the free course of the tide, are (in pursuance of an act of parliament) formed of large piles driven firmly into the ground, upon which are laid transverse beams, covered with close planking. Cranes are fixed on these staiths, and on the town side there is an extensive range of private warehouses for sufferance goods.

Tides. The time of high water at Hull at the full and change of the moon, is six o'clock, but the highest tides are generally two or three days afterwards; the flow or rise of an average spring tide is about 21 feet at the harbor mouth, and 17 feet at the entrance to the Old dock; that of an average neap tide, 12 feet at the harbor mouth, and 9 feet opposite the Old dock entrance: but it may be observed, that the tides occasionally rise three to four feet higher, and sometimes, though rarely a little more, and ebb sometimes two feet or more, lower than stated above. It may be proper to notice also, that when there are many vessels in the harbor, the ebb is not so low by nearly a foot, as when it is clear of shipping. The tide flows about five hours at the harbor mouth, and four hours and a half at the entrance of the Old dock.

THE OLD DOCK.

In consequence of the confined state of the old harbor and other inconveniences already briefly noticed, application had been made to goverment. a few years before obtaining the Act for making the Old dock, for a grant of part of the King's works near the Garrison, for the purpose of enlarging the harbor; but, as a legal quay formed no part of the scheme, it was opposed by the board of Customs, and nothing further was done. Some time after however, it was intimated to the Collector and Comptroller of Customs at the port, that if a dock and legal quay were not made at Hull, the business would be removed to some other port connected with the Humber disposed to conform to these regulations; and a memorial was in consequence presented by the merchants of Gainsborough, praying that a legal quay might be established at that place.

It was now evident that something must be done to preserve the trade of the port, and it was at length resolved that the wishes of government as to a dock and legal quay should be complied with; but there appears to have been great difficulty in obtaining an adequate subscription, and it was some time before this desirable object could be accomplished. The shareholders employed Mr. Grundy, the engineer, to furnish designs and an estimate for the work, which being approved of, and the necessary arrangements completed, application was made to parliament and an Act obtained in April, 1774, soon after which the work was begun.

At that period works of this kind were in their infancy, and we must not therefore look for the degree of perfection, either in design or execution, which has distinguished those of more recent times.

The Old dock, which appears to have been judiciously planned and laid out, is Dimensions of dock. 1703 feet long, by 254 feet wide, so that the superficial content is nearly ten acres, and therefore capable of containing a hundred square rigged vessels; it was the largest dock in the kingdom at the time.

Excavation. According to the sections the excavation averaged about 15 feet, the bottom of the dock being 15 inches above the bed of the old harbor opposite the entrance. The soil, which was altogether alluvial, was deposited upon land chiefly on the north side, and partly purchased for the purpose, which being raised thereby about five feet, and afterwards sold by the Dock Company, is now the site of several principal streets.

Dock walls: Plan No. 2. The walls are founded upon piling of a novel description, but very inadequate to the purpose: the piles, which are 12 inches wide by 9 inches thick at the top tapering regularly to 3 inches at the bottom, are driven under the walls and counterforts, longitudinal sleepers, 12 inches wide by 6 inches deep, trenailed on the pile heads, and 3 inch transverse planking laid and spiked down on them: the whole is of fir timber, and laid perfectly level.

The walls are wholly of bricks, many of them made upon the spot, coped with Bramley-fall stone, 12 inches thick, and 3 feet wide. They were built and grouted with mortar made of Warmsworth lime and sand, part of which was fresh water sand, and the rest selected from the excavation; the brickwork, for 14 inches in depth, is at right angles to the face, the rest of the wall horizontal,—a mode of laying by no means to be recommended, as the front is thereby completely separated from the other part of the wall, and the bond, a most essential part of all building, thus entirely destroyed.

In front of the wall, at intervals of ten feet, oak fenders 9 inches wide, and projecting 7½ inches, are tenoned into three oak sills, 12 inches by 6 inches, built in the brickwork, and bolted and further secured to them by oak brackets spiked on each side.

From the insufficiency of the piling, and the foundation, which was only level with the bottom of the dock, not being low enough, the walls have subsided, and been forced forward in several places by the pressure of the earth behind; the greatest derangement is on the north side near the east end, noticed by Smeaton in his reports as being at that time 2 feet 8½ inches out of a straight line in a length of 187 yards, and found by recent measurement to be now 3 feet 10 inches out in 202 yards, or about a foot more than when examined by Smeaton shortly before the opening of the dock: the wall on the south side nearly opposite the above, for 103 yards in length, is also forced forward about 20 inches in the worst place: the rest of the dock walls are nearly as straight as when first built. This wall has given way at different times, (probably from the quays being overloaded,) and in several places eleven or twelve feet at top have been taken down and re-built; piles have also been driven down in front of the wall, and a cap sill with transverse planking laid thereon, upon which the new wall has been erected; this has answered the purpose, and as a further security a mass of well rammed clay has been lately deposited at the foot of the weakest parts of the wall.

Lock and basin. The original lock was 200 feet in extreme length, and 36 feet 6 inches wide, by 24 feet 6 inches deep; there were six rows of grooved sheet piling 14 feet long across the lock, which was founded on 1245 bearing piles 12 feet long, of a similar description to those for the dock walls, and on these longitudinal and transverse beams were laid, and covered with 4 inch planking, so as to form a wooden floor, which was the customary mode of building at that time.

The lock walls were built with bricks, faced with Mexborough stone, from 10 inches to 3 feet, or, on an average, 18 inches deep in the bed, with occasional *through* stones to bind the work together; the hollow quoins and coping were of Bramley-fall stone, the faces of which were set in pozzuolana mortar, as also the front masonry: the gates were made of English oak, in an arched form, and but 12 inches thick, including the planking. There was only one clough or slice, 3 feet by 18 inches, in each gate, which did not give sufficient power to cleanse the lock and basin, without having recourse to a small lighter and drag to loosen and remove the mud whilst scouring.

There was a common wooden drawbridge on the Dutch plan, over the end of the lock.

The basin to this dock was originally 212 feet long, and 80 feet wide, with brick walls like the dock, but the wall on the north side, from some defect in the foundation, gave way before it was finished, and was in consequence never raised to its full height, a sort of timber platform being erected on it, which remained till the basin was rebuilt in 1815.

The foundations of the lock walls were also insufficiently piled, as appears from Smeatons Report, in which it is stated that, "respecting the walls of the lock they have the appearance of being well built; we, however, observe some small sets therein which we impute to the want of strength in the foundation timbers." He furthers says, "that the floor of the chamber had risen about three inches in the middle, and that of the platform to the gates from two to four inches."

In the course of seven or eight years after the lock was built, the walls had yielded so much as to require to be taken down about 12 feet from the top; one side was rebuilt in 1785, and the other the following year.

Quays. The quays are spacious and paved with pebbles from Spurn Point. A legal quay extends on the south side of this dock from the river Hull to Whitefriar-Gate Lock, a length of 1558 ft., and contains an area of 18,160 square yds., the superficial content of the whole quayage being about 29,000 square yards.

Moorings. The mooring posts to this dock were originally of oak, 15 to 18 inches diameter at the top, 2 or 3 feet above the quay, and 8 or 9 feet in the ground, with two oak land ties, each 20 feet long, the ends of which were secured by cross timbers, and two piles to each; the posts are 12 feet from the side of the dock, and 14 or fifteen yards asunder. A very high wind arising one night, soon after the dock was made, the ships moored in the evening on one side were found next morning on the other, having dragged several of the mooring posts along with them, a plain indication that these posts had not been very securely fixed. I understand that several of the posts were renewed about twenty years ago, but there are a great many of the original ones still standing, though the parts above ground are generally in a very dilapidated state, and much worn by the mooring ropes and chains. In taking up several of these we found them, excepting the sap and about an inch of the heart on the outside, very sound and good, to within two or three feet of the ground; but the land ties, though also of oak, being within two or three feet of the surface, were generally a good deal decayed; some few which were of elm were completely rotten. In most cases the decayed wooden moorings have been replaced by stone ones, either of Peterhead granite, or a sort of free stone from near Rotherham, about 2 feet 6 inches above ground, 18 to 20 inches diameter at top, and 15 to 17 inches at the surface: by being thus tapered downwards, they have been so weakened, as to be occasionally broken off by the shipping in very windy weather. The part of the stone in the ground is about 2 feet square, and 6 to 8 feet long, set upon oak plank, and secured by land ties similar to the wood posts.

Sheds, warehouses, and cranes. There are two sheds upon the legal quay 13 feet from the dock, 23 feet wide, and together 635 feet long, with doors at regular intervals on the south side, and small openings or shutters for the admission of light; the north side is quite open. The long shed was erected immediately after the opening of the dock; the other, several years later.

A little to the south of the sheds, on the extremity of the Company's land, stands a range of warehouses, 345 feet long, of irregular breadths, consisting of three floors besides the cellars, and comprising a space of about 2250 square yards. The cellars are all arched with brick, and there are six cranes to these warehouses, which being the only ones belonging to the Company, are now used indiscriminately for all the docks, a railroad being laid down nearly their whole length, for the conveyance of goods between the warehouses and the shipping in the different docks.

There are six wooden cranes to this dock, four on the south side, and two on the north; the latter are *well* cranes, very lofty, fixed about six feet from the side of the quay, and calculated to lift four or five tons: the others are of a lighter description, the jibs close to the dock, and supported by frame-work in the old fashioned way; one of these is worked by a tread-wheel.

Mud in dock. Various schemes had been suggested for cleansing the dock of the mud brought in by the tide; one was by making reservoirs in the fortifications of old town ditches, with the requisite sluices, by means of which the mud was to be scoured out at low water; another by cutting a canal to the Humber, from the west end of the dock, where sluices had been provided, and put down for the purpose, when it was proposed to divert the ebb tide from the river Hull along the dock, and through the sluices and canal into the Humber, and so produce a current sufficient, with a little manual assistance, to carry away the mud. Both of these schemes were however abandoned, and the plan of a horse dredging machine adopted; this work began about four years after the Old dock was completed, and continued until after the opening of the Junction dock. The machine was contained in a square and flat bottomed vessel 61 feet 6 inches long, 22 feet 6 inches wide, and drawing 4 feet water, it at first had only eleven buckets, calculated to work in 14 feet water, in which state it remained till 1814, when two buckets were added so as to work in 17 feet water, and in 1827 a further addition of four buckets was made, giving seventeen altogether, which enabled it to work in the highest spring tides. The machine was attended by three men, and worked by two horses, which did it at first with ease, but since the addition of the last four buckets, the work has been exceedingly hard.

There were generally six mud boats employed in this dock before the Humber dock was made; since which there have been only four, containing, when fully laden, about 180 tons, and usually filled in about six or seven hours; they are then taken down the old harbor and discharged in the Humber at about a hundred fathoms beyond low water mark, after which they are brought back into the dock, sometimes in three or four hours, but generally more.—The mud engine has been usually employed seven or eight months in the year, commencing work in April or May.

The quantity of mud raised prior to the

opening of the Junction dock, varied from 12,000 to 29,000 tons, and averaged 19,000 tons per annum; except for a few years before the rebuilding of the Old lock, when from the bad and leaky state of the gates, a greater supply of water was required for the dock, and the average yearly quantity was about 25,000 tons. As the Junction dock, and in part also the Humber dock, are now supplied from this source, a greater quantity of water flows through the Old dock, and the mud removed has of late been about 23,000 tons a year.

It may be observed, that the greatest quantity of mud is brought into the dock during spring tides, and particularly in dry seasons, when there is not much fresh water in the Hull; in neap tides, and during freshes in the river, very little mud comes in.

Town sewers. There are two sluices in this dock, for scouring the town sewers; both on the south side, one being opposite the end of Low-Gate, the other near the Whitefriar-Gate lock; they consist of a cast iron clough 3 feet 2 inches wide by 2 feet 11 inches high worked in a groove by means of a screw, with a conduit, also of cast iron, 3 feet wide by 2 feet 6 inches high, the bottom being about 9 feet below the dock coping.

Dock opened. By the Act of Parliament seven years were allowed for finishing this dock, but by great exertions the work was completed in four years, and the dock was opened on the 22d of September, 1778.

Rebuilding of lock and basin. The next improvement in the order of time, was the Humber dock; but as an important part of the work connected with the Old dock, namely, the entrance lock and basin, has since been completely rebuilt on an improved plan, it may be advisable to give a brief description thereof before proceeding to the Humber dock.

State of old work. This reconstruction became necessary in the early part of 1814, from the ruinous state in which the lock then was. The water being drawn out of the dock to within four or five feet of the bottom, a coffer dam formed at the outer end of the basin adjoining the harbor, and a temporary dam of clay three or four feet above the surface of the water, on the side next the dock, the lock and basin walls were taken down, and it was found that the stone facing was much decayed, the mortar almost entirely washed out of the joints, particularly above high water of neap tides, and the walls greatly defaced by the coal hooks and stowers used in passing vessels through the lock: below the level of neap tides the stone was in a better state of preservation, but from its softness was a little worn away by the shipping; the hollow quoins which had been forced forward were in a bad state, and caused a great quantity of water to be wasted. The piles, sleepers, and planking, in the bottom of the lock and foundations, were all perfectly sound; the nails and small spikes were much wasted, but a great many of the large spikes and bolts were so little corroded, that they were used again in the construction of the new lock; the foundations had however sunk, by which the upper part of the wall was brought forward, and the timbers of the floor were several inches higher in the middle than at the sides.

The gates, which, when new, were much too slight, had become actually dangerous, although there had been new head posts to them all: and when they were taken up, the mortices, tenons, and iron fastenings were so bad, that they literally dropped to pieces.

The basin walls and foundations were in much the same state as the lock; but the front piles were pressed down by the superincumbent weight, in some places 18 inches lower than the back ones, and the top of the wall bulged out in consequence. The ground in this part appears to have been particularly soft.

New lock. The ground having been cleared, the rebuilding of the lock was begun in May, 1814, from the design and under the direction of the late Mr. Rennie, Mr. George Miller being the company's resident engineer. This lock is 120 feet 9 inches long within the gates, 24 feet 6 inches high above the pointing sills, and 38 feet wide at the top, being 18 inches wider than the original lock: the foundation and walls are nearly the same as in the Humber dock lock, which will be more particularly described hereafter; but it should be observed that all the old piles remained to strengthen the foundation. The inverted arch is built with bricks set in pozzuolana mortar, as also the side walls, which are faced with Bramley fall stone, the first or lowest course being all headers 4 feet in the bed by 18 inches thick; the hollow quoins came from near Rotherham, and are set in the same mortar; the backing or body of the wall is brick work, with one entire *through* course and occasional *through* stones besides, set and grouted in common mortar; and the coping is of Brainley-fall stone, 4 feet wide by 15 inches thick, joined together with stone dowels. This lock appears substantially and well built.

Gates. The gates, except the planking which is 2½ inch fir, are all of English oak, and are each 23 feet wide, 24 feet and 3 inches high above the pointing sill, 16 inches thick at the heel, and 14½ inches at the head, including the close planking: there are ten bars or ribs of a curved form, the versed sine of which is 12 inches in the inside, tenoned into the head and heel posts, and further secured by wrought iron straps and screw bolts in the usual way: the two gate sluices of cast iron are 2 feet 6 inches square in the clear, and are worked by a wrought iron screw and brass nut, with bevel gear at top. The gates are moved by machinery on the sides of the lock, turning a cast iron roller, round which the chain revolves; these chains are all of ⅞ inch iron, and are fixed from two to four feet above the bottom sill for shutting, and 7 feet for opening the gates, the latter operation being assisted by a counterbalance weight to prevent the chains from running off the roller. There are one horizontal and two vertical rollers fixed in the front of the lock walls about ten feet above the sill, with another large horizontal one at the foot of each wall, round which the chains turn in working the gates. A cast iron socket in the bottom of the heel post 3½ inches diameter, by 1¾ inch deep, turns upon a cast iron pivot fixed on the platform; and a friction roller of brass (by which the gate moves on a cast iron segment in the bottom) 10 inches diameter by 4 inches wide, is fixed in a cast iron box or frame near the meeting post, with a wrought iron regulating rod reaching up to near the top of the gate, for adjusting the roller to the proper height. The gate is secured at top by means of a cast iron anchor with wrought iron collar in the common way.

From the frequent working of the gates the pivot and socket on which they turn at the bottom wear away, in which case the gates are occasionally lifted up a little by screws, and a piece of hard brass about an inch thick is nicely fitted into the socket, to restore the original height.

Balance bridge. The bridge over the lock is of cast iron, on the lifting principle, and 15 feet wide, the carriage way being 7 feet 6 inches, and the foot ways 3 feet 6 inches each; the whole length is 81 feet. The bridge consists of six ribs, 1½ inch thick in the plain part, and 3 inches at the edge or flanch, 9 inches deep at the meeting or middle, increasing, though not regularly, towards the sides, and it turns on a cast iron shaft or main axis 8 inches square, with four round bearings working in plummer blocks, fixed in cast iron carriages, bolted to the masonry of the lock. When the bridge is to be opened, a cast iron flap, turning on an axis 4½ inches square, is lifted by a lever, in order to give room for it to rise: this flap forms at the same time a guard or barrier against passengers, and after the bridge is lowered into its place it is let down and forms part of the roadway. The bridge is covered with 3 inch oak plank laid across and bolted to the ribs; in the carriage way the planks are, for preservation, overlaid with 1½ inch fir or elm boards which are renewed from time to time, and the foot paths are covered with similar boards on oak joists, elevated about five inches above the carriage way, with a cast iron curb on each side, and wrought iron stanchions and chains as a fence on the outside. In lowering the bridge, when first erected, one of the outside ribs was broken by striking against the under side of the fixed planking at the outer end; this was repaired by bolting a cast iron plate to one side, and for greater security all the ribs were afterwards strengthened in the same manner. It will be understood, from the principle of this bridge, that as it is raised, the outer end descends into a quadrantal pit or cavity, which, to ensure proper working, it is essential should be kept clear of water. The machinery is similar to that of the Junction dock bridges, which will be more particularly described afterwards; one man *can* raise or lower each leaf in half a minute, but two men with the greatest ease.

From a small yielding of the walls, the bridges was forced from its bearings on both sides, by which the weight of the carriages passing over it was thrown upon the

main shaft; this has lately been remidied by cramping wrought iron plates, ¾ inch thick, to the bearings of each rib. This bridge, the first of the kind erected in Hull, was cast and put up by Messrs. Ayden and Etwell, of the Shelf Iron Works near Bradford, and weighs, exclusive of the wood work, about eighty tons.

Basin. The entrance basin is 213 feet long by 80 feet 6 inches wide at the top, 71 feet at the bottom, and the same depth as the dock. The walls are of brick with a Bramley-fall stone coping, a *through* course 14 feet from the bottom, and oak fenders on the same plan as the Humber dock; the walls are supported at foot by means of brick inverted arches across the bottom 6 feet wide by 18 inches deep, with spaces ten feet wide between, and the whole is covered with earth to nearly the level of the lock sills.

Re-opened. This lock and basin were finished and re-opened on the 13th of November, 1815.

Lockage. With a rising tide, it is usual to begin locking when there is a depth of 6 to 7 feet on the sill, and when required, five pens can be made before the water is level inside and out; the gates are then all opened, and large ships passed at the top of the tide, after which they are again closed; but the penning is frequently resumed, until the water has fallen to about 7 feet on the sill, by which time five pens more have been made. Seven or eight hours a tide are thus occupied in locking; and when business presses, this is done during both tides. If there are many large vessels to pass, it is sometimes found necessary to draw off the water one or two feet, so that the surface on the two sides may become level sooner, and the gates continue longer open, of which advantage is also taken to pass craft without the labor and delay of lockage; but this practice is never resorted to, except in cases of necessity, as the deposite of mud in the dock is much increased by it, the water abstracted, which is comparatively pure from time having been allowed for subsidence, being replaced by the very muddy water of the tide. In busy times, the gates have also sometimes to be kept open for a short time after high water, and in neap tides doing so is unobjectionable; but in springs it ought to be avoided, as from there being then a considerable current through the lock, when the tide has begun to ebb, there is some difficul y and risk in shutting them.

State of dock walls. Before concluding this brief account of the Old dock, it may not be deemed irrelevant to point out the state of the walls and foundations, as found in executing the Junction Dock, when they were taken down, at the western extremity, as far as the north gates of the Whitefriar-Gate Lock.

The timber and planking of the foundations were perfectly sound, and the spikes also generally in a good state; but the oak fenders were decayed and a good deal bruised and worn away at the upper part by the vessels; new tops had been scarved to many, but the part of the fenders below an average tide, say eight or nine feet under the coping, as well as the sills and brackets for securing them, were generally sound, the sap and a little of the outside excepted.

The front of the wall for about the same depth had but an indifferent appearance, the bricks being in places much decayed and rubbed away by the vessels, and the mortar washed out of the joints; but below this the bricks were generally in a much better state, and the pointing nearly entire. It has been before observed that the mortar for this wall was made partly from sand dug out of the dock, which was far from being of the best quality; the interior of the wall was grouted, and not very sparingly, as in some places the mortar was found nearly as thick as the bricks. The mortar in the inside of the wall varied very much in quality according to circumstances; where the wall was solid and undisturbed, it was very hard, requiring picks, and in many places sledges and wedges, to take it down; but where the wall had given way or been otherwise disturbed, and cracks and cavities thus caused in the inside, the mortar was in general very soft. This was observed in a variety of places, and it was not uncommon to see the mortar in one part of the wall exceedingly hard and good, and within a few inches from it, where the wall was open and the water had found its way, quite soft and bad, or but little harder than when first built. From this we see how essential it is, that building in water should have a substantial and immovable foundation, and that the walls should be completely solid and impervious, particularly where a good water lime cannot easily be obtained.

From the front of the wall not being properly bonded to the back, the parts are not only unconnected, but in many places entirely separate, so that a rod may be thrust down many feet between them. It was observed also, that where the wall had given way, it was completely separated from the counterforts, to the extent, I understand, of one to two feet or more in the worst places, whereby the strength of the wall has been greatly reduced.

THE HUMBER DOCK.

Before the Act was obtained for making the Humber dock, the Old dock and harbor were found insufficient for the shipping and increased business of the port. This want of accommodation had been felt and complained of for some time, and various plans and schemes were proposed for the improvement of the port, all having in view increased dock and quay room. One proposal was to make another dock on the east side of the old harbor, and connected therewith by a suitable lock: another was to convert the harbor itself into a floating dock, by an entrance lock near the Humber and another lock near the north bridge; and to excavate a new channel for the river Hull from above the proposed dock, to the Humber, eastward of the Garrison: but fortunately for the port, neither of these plans was adopted.

The Dock Company, in order to obtain the best advice on a matter of so much importance, called in the able assistance of the late Mr. Rennie, who was afterwards joined with Mr. William Chapman, of Newcastle-upon-Tyne, on behalf of the Corporation of Hull. These gentlemen furnished the plans for this dock, and the work was carried on and completed under their joint direction: Mr. John Harrop, an old servant of the company, (who had done the carpenter's work of the Old dock,) was the resident engineer, and was assisted by Mr. George Miller, afterwards his successor.

The Act of parliament was passed in 1802, and the work was begun early in the following year.

Area of dock. The area of this dock is seven acres and a half, and will contain seventy square rigged vessels, with ample room for moving them; but there have been a hundred sea-going vessels, besides thirty or forty smaller craft, in it at one time.

Coffer dam. The coffer dam at the south end of the lock, for keeping out the tidal water during the execution of the works, was 280 feet span, and the versed sine 140 feet; it consisted of two concentric rows of close Danzig piling, 13 to 14 inches square, and 7 feet 6 inches apart, well bolted and braced together, with a trunk and shuttle in the middle at the bottom, the internal space being filled up with bricks laid in sand to above the level of high water. This dam was firmly and judiciously constructed, but having sometimes a perpendicular head of water of nearly thirty feet against it, showed signs of great weakness during an extraordinary high tide a little before the work was completed; being however promptly secured by shores and braces, no further damage ensued.

A steam-engine of six horse power was fixed upon the east side of the lock, and worked two 11 inch pumps, for keeping the works clear of water, and also at the same time, two 7 cwt. rams for driving the piles of the coffer dam.

Excavation. The excavation of the dock was 24 feet deep on an average, all in alluvial soil; the upper part for about five feet in depth was good clay, of which a great many bricks were made for the use of the works; and the rest of the soil was used to raise the ground and form the quay and road on the west side of the dock, and also the beach or shore of the Humber from the mouth of the old harbor to some distance above the dock; on part of this ground, several good streets have since been built. Notwithstanding the immediate contiguity of the dock to the Humber a fine fresh water spring was found in the excavation of the lock pit, which was so powerful, that the stopping of it was attended with considerable difficulty and expense. The bottom of this dock, for reasons not very obvious, is not so low by ten inches as the lock sills.

The site of the basin, being outside the coffer dam, and overflowed by the Humber every tide, was excavated by tide work. Part of the soil was removed by horse runs, to raise the ground near the lock, and the remainder conveyed away in ballast lighters, and discharged in the Humber.

To be Continued.

however sunk, by which the upper part of the above the sill, with another large horizon- ges passing over it was thrown upon the

The substance described in the following paper promises to extend the usefulness of Caoutchouc, or India Rubber, which has already become one of the most useful materials of modern manufacture.

The remarkable property of dissolving copal and other substances used in painting and varnishing, will cause *Caoutchoucine* to become an article of constant employment, and its manufacture profitable to the maker and consumer. It is worthy of the earnest attention of practical and scientific men.

From the London Journal of Arts and Sciences.

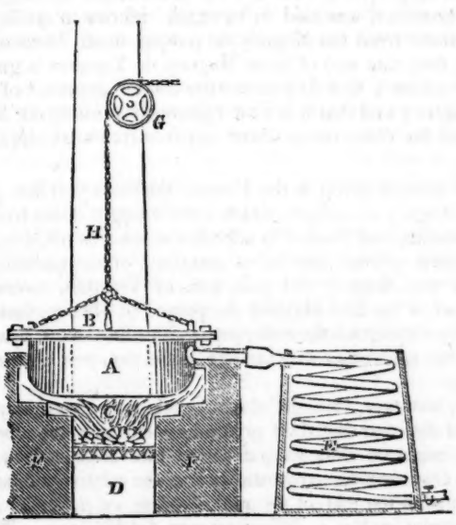
A SOLVENT NOT HITHERTO USED IN THE ARTS.

A patent was granted to William Henry Barnard, of the city of London, for his invention of "a solvent not hitherto used in the arts."—[Sealed 20th August, 1833.]

My invention consists in an essential oil or liquid, which I obtain by the distillation of a well known article of commerce, imported into this country from Para, Valparaiso, Sincapore, and other places, under the title of caoutchouc, or India rubber, which is to be performed in the following manner:

I take a mass of the said caoutchouc, or India rubber, as imported, and having cut it into small lumps, containing about two cubic inches each, (which I prefer,) I throw these lumps into a cast-iron still (which I find adapted to the purpose, and a diagram of which is annexed to, and forms part of, this my specification,) with a worm attached as in the figure:

A, is the still; B, the cover ground to a metallic fit, and held down with cramps and set screws; through the cover there is a hole with a plug ground to fit, to admit of a thermometer to take the temperature; C, the fire-place; D, Ash-pit, E, the worm-tub; F, the brick work of still; G, a roller and carriage, in conjunction with a crane, or other means, to raise the cover to take out the residue, and to charge the same; H, the chain.



I then apply heat to the still in the usual manner, which heat is increased until the thermoneter ranges at 600 degrees of Fahrenheit, or thereabout. And as the thermometer ranges progressively upwards to 600 degrees Fahrenheit, a dark colored oil or liquid if distilled over, which I claim as my said invention; such liquid being a solvent of caoutchouc, and other resinous and oleaginous substances. When the thermometer reaches 600 degrees, or thereabouts, nothing is left in the still but dirt and charcoal.

I have found the operation of distillation to be facilitated by the addition of a portion of this oil, either previous or subsequent to rectification, as hereinafter mentioned, in the proportion of one-third oil to two-thirds caoutchouc, or thereabout.

I afterwards subject the dark colored liquid thus distilled over to the ordinary process of rectification, and thereby obtain fluids, varying in specific gravity, of which the lightest hitherto has not been under .670 taking distilled water at 1,000; which fluid I also claim as my said invention.

At each rectification the color of the liquid becomes more bright and transparent, until at the specific gravity of .680, or thereabouts, it is colorless and highly volatile.

In the process of rectification (for the purpose of obtaining a larger product of the oil colorless,) I put about one-third water into the still. In each and every state the liquid is a solvent of caoutchouc, and several resinous and oleaginous substances, and also of other substances, and (such as copal) in combination with every strong alcohol.

Having experienced much diffiulty in removing the dirt which adheres to the bottom of the still, I throw into the still lead and tin in a state of alloy (commonly called solder,) to the dept of about half an inch; and as this becomes fused, the dirt which lies on the surface of is more easily removed.

Objections having been made to the smell of this liquid, I have found such smell removed by mixing and shaking up the liquid with nitro-muriatic acid, or chlorine, in the proportion of a quarter of a pint of the acid (of the usual commercial strength) to a gallon of the liquid.

And whereas I claim as my invention, the said solvent or liquid when first distilled over, and in each and every stage of its rectification.

—

The discovery of the chemical solvent, which forms the subject of the patent above described, has excited considerable interest in the philosophic world, not only from its extensive usefulness as a new article of commerce, but also from two very extraordinary characteristics which it is found to possess, viz.: that in a liquid state it has less specific gravity than any other liquid known to chemists, being considerably lighter than sulphuric æther, and in a state of vapor is heavier than the most ponderous of gasses.

The properties of this singular production are yet but in a small degree developed. Dr. Faraday, of the Royal Institution, and Dr. Hue, of St. Bartholomew's Hospital, have both directed their attention to the subject, and have given to the solvent the denomination of *caoutchoucine*, as the distilled product of *caoutchouc*, the elastic gum, known under the common name of India rubber.

This elastic gum is produced by a variety of trees, and is found in all countries at or near the Tropics. The Heavea Caoutchouc (whence the name) grows in South America; the Urceola Elastica in Sumatra; the Ficul Elastica and Ficus Indica (Banyan) in various parts of the East Indies; the Artocarpus Incisa (bread fruit-tree) in the West Indies—we have it also from Africa, but from a variety of trees. Those above enumerated are clearly of totally different descriptions, some growing as climbing plants, some as forest trees. These trees yield the fluid in immense quantities; it is said, in some instances, as much as two-thirds the weight of the boughs whence it is drawn, and when exhausted by repeated tappings, renew the supply after a few months' rest.

Dr. Faraday stated the component parts of a quantity of the fluid he had analysed to be as follows:—

Caoutchouc,	,317.0
Albuminous matter,	19.0
Azotic, bitter coloring matter,	70.0
Wax,	1.3
Soluble substance,	29.0
Water, acid, &c.,	,563.7
	1000.0

Its elements—

Carbon,	6.812	8 proportions.
Hydrogen,	1.000	7 proportions.

There is not a particle of oxygen in the fluid after distillation, when in its most highly-rectified form, and it is capable of preserving potassium. It mixes readily with pure alcohol, but refuses to do so as soon as its specific gravity increases. We do not know at what exact weight a separation takes place, but imagine, from reported experiments, that at a specific gravity of 0.75, it will no longer unite with alcohol. This fluid is obtained at all the intermediate gravities between 0.68 and 0.88. Perhaps if these operations were conducted with very great nicety, and the caoutchouc could be procured, divested of all foreign matter and impurities, water, &c., we should obtain by distillation the precise weight of fluid for the weight of solid operated on.

Concluded in our next.

We give another portion from Dr. Perrine's interesting communicacion, and will give the remainder in our next.

From the New York Farmer.

TROPICAL FIBROUS PLANTS.

Continued from p. 330

I am however pleased to say, that their success has been as great as could be reasonably expected. As the Agaves and Bromelius prefer the most arid sand and sterile soils, it might have been rationally inferred that they would inevitably perish on the rich marshy banks of the Mississippi. I had sent from Campeche four distinct species of Agave, and though all planted in the open air are still alive at their roots, and two have leaves from two to two and a half feet above the ground. The growth of the latter, since I have been here, appears to be *greater in a given time* than in Yucatan. But what has pleased me still more is the discovery that there are various plants of a fibrous leaved species of Agave, which have been growing in this neighborhood several years. The Convent, or Young Ladies' School, is about four hundred yards from this farm, and near the Levee, in a yard a little distance south-west, is growing one Agave whose leaves even were not affected by the winter. At the garden of a respectable planter, Mr. Mather, about four miles below, are five Agaves which have been growing several years, and of which only a portion of the leaves were deprived of their vital powers last winter. I say deprived of their vital powers, because the word *kill* would be rather too strong, it would generally imply that they were destroyed, or rendered useless. But I believe that so far from it, the misfortune of having the leaves frozen may be turned into a benefit, as it renders their dressing much easier. I go farther, I believe it will render the fibres much whiter! Several of the leaves of my plants on this farm have become completely bleached.

This reminds me of a fact which occurred in New-York during my visit there in 1831–2. In the winter I was at the seed-store of Thorburn, and was told that he had an Agave from St. Domingo, in the back yard, which had been frozen and was cut down.—I went back and found the central cone of rolled up leaves, which were all of a beautiful *pearly white*. At that time I supposed that the whiteness depended on the exclusion of light, as exhibited in the internal layers of cabbage leave. I however paid a boy to carry the mass to Peales' Museum. The frozen cone was put in a cold spot behind the Museum, and the leaves were taken off day by day, as needed for my experiment. The cuticle would separate so easily that I could blow it up with a pipe stem; and was so impervious to air, that by stopping the hole it would remain inflated like a bladder. One long broad leaf, thus inflated, was hung up in the shop of the chemist George Chilton, who was asked what sort of a fish that was; and it indeed excited the curiosity of all who saw it. Of other leaves the fibers were exposed with the greatest facility, and they were left at the Museum for the inspection of the public. But it is getting dark—my head aches greatly—my thoughts become more and more confused. Farewell till tomorrow.

9 o'clock, P. M.

As I cannot sleep, I get up again and continue. The subject of fibrous leaved plants is too important to omit details, especially in the dearth of information to be obtained from books, and from the fact that what little is published contains so many errors that readers are rather prejudiced than benefitted by the perusal. Originally misled by Humboldt every body exclaims American Aloes or Agave Americana, whenever they see a mass of thick broad succulent sword shaped leaves, with thorns or prickles on the edges or at the points; and if they have read or heard what he wrote about it, in his Essay on New Spain, they conclude that they know all that can be known about this kind of plants. In many numbers of your Farmer I have endeavored to communicate additional and very important information. I have shown that the Maguey de *pulque*, or *the* Agave, which yields the celebrated drink of Mexico from its developing stalks, is only *one* of many species of the Agave: that Humboldt himself tacitly admits that fact, that he even confesses that the Maguey, whose juice is principally used for distilling the *Mezcal*, or ardent spirits, appears to be a different species. It is but natural to suppose that a plant which yields sap so abundantly, should be very succulent in its texture, and that as it peculiar function was to secrete juices, it would not estrange itself so far as to divide a part of its vital power in the labor of forming fibres. The inference is supported by the fact that the leaves of the true pulque Agave are nearly as brittle as the leaves of some true Aloes, and hence no doubt the popular name of American Aloe first originated from observing this internal analogy confirmative of its external appearance.—Indeed so few fibres, and so feeble, exist in the leaves of the drink producing Agave, *that they are eaten by cattle*, both in America and Europe. The very fibrous leaved specie of Agave are in a very different condition. The vital powers of the plant are not diminished by forming juices for secretion on *contreward*, but on the contrary are employed altogether outward in fabricating fibres longitudinally and parallelly throughout the leaves. I think it would try the strength of a very strong man to *break*, a-crosswise, a full grown leaf of the really fibrous species, and that if cattle should eat and *swallow* such leaves, they might next be turned to pasture on mature hempstalks. For the purposes of this communication however, it may be advisable to omit all tedious botanical details, and to consent, that for the present, all the drink secreting Agaves shall be known under their Mexican generic names of Maguey, and under the botanical name of Agave Americana: and we will treat of the peculiarly fibrous leaved species under their Yucatan generic name of Honequen, and under the botanical name of Agave Sisalana.

We are now ready to proceed, premising still further that we must consider as *varieties* of the two agreed species, various Agaves, which are likely distinct *species* of two subdivisions of that genus. We have seen then that Humboldt admits that there is at least, one variety of the Maquey in Mexico, dedicated to distillation of ardent spirits, which differs sensible in its appearance from the Maquey de pulque used exclusively to produce the fermented drink of that name. I now add that in Yucatan there is a third variety, which so much resembles the others, that it is there called Maguey *del pais*, (of the country,) and that the highland soldiers in the garrison at Campeche, have, in a few instances, made some bottles of *Pulque* from the juice, to please the appetites of their officers, who longed for a taste of their accustomed beverage. The product, however, was said to be much inferior in quality to the pulque made from the Maguey de pulque upon Mexico. Now mark the fact, that one of these Maguey de Yucatan is growing in the garden here; that its leaves were not all deprived of vitality by the winter; and that it is now vigorously pushing out both new leaves and the older ones, whose upper halves were nipped by the cold.

I have already given in the Farmer the history of four plants of the real Maguey de pulque, which were brought down from Mexico to Yucatan, and planted in a lot in the suburbs of Campeche.—These plants served me as a standard of comparison. The plants of the Maguey del pais, i. e., of Yucatan, resembled so much those of the true Maguey de pulque of Mexico, that I could not readily distinguish the differences when they were apart or so distant from each other that the eye could not rest on both at the same time

When, however, brought close together, even an unpractised eye could discover that their general appearance was distinct, although it might be difficult to describe the difference in precise words. One striking circumstance was the relatively much greater *thickness* of the leaf of the real Maguey de pulque. In their internal structure too, a difference was readily seen. The fracture of the leaf of the true Maguey de pulque exhibited a more transparent gelatinous character, more nearly resembling the fracture of a leaf of the true Aloes; and although the fibres of the leaves of the Maguey de Yucatan are neither abundant nor good enough to be extracted for practical use, yet the fibres of the Maguey de pulque were still fewer, finer, and feebler.

Now mark also this fact, that one of these Maguey de pulque de Mexico is also growing in this garden, in as good a condition, if not better, than the Maguey de Yucatan. I may *possibly* be mistaken in comparing them at their present height; but I do not think so. They may both be the same variety; but I do not believe it. Climate may have already modified each; yet I am willing to let my discernment be tested by their future process.

Hence, at all events, we have at least a variety of *the* Agave Americana sent from the tropical climate and dry sterile soil of Yucatan, and growing in the cold climate and wet fertile soil of Louisiana.

(To be concluded in our next.)

From the London Mechanics' Magazine.

ON THE SHRINKAGE AND EXPANSION OF IRON IN THE PROCESS OF CASTING.

SIR,—A short time since I was favored with the loan of the 18th vol. of the *Philosophical Magazine*, on account of its first article, which treats at some length of a subject on which I have before addressed you; (see vols. xvi. and xvii. pp. 108 and 61) and although I agree with the author, Mr. David Musshet, as to most of the facts therein described, I differ essentially in the more material point, viz., that of accounting for them.

In his preamble, Mr. M. says, "When the object of experiment is exposed to a heat sufficient to fuse it, it then becomes subject to new laws as a fluid, and exhibits phenomena entirely different By not taking the change of state, from that of a solid to that of a fluid, into account, some writers have given an *awkward and unsatisfactory account of the laws* which regulate iron in these two different states. Before I proceed to detail some experiments made upon the subject, I shall trace out the different states of shrinkage and expansion, as observed in cast iron. In doing this I shall divide shrinkage into two distinct operations: 1st, Shrinkage, properly so called, when a mass of iron *diminishes or shrinks within itself*, and would actually *displace a smaller quantity of water*, and when *no degree of heat short of fusion would make it occupy its former bulk or volume.*"

"2nd, Contraction, or that diminution of superficial measurement which any body undergoes by evolving its caloric." A unique division this, and very explicit—shrinkage diminishes a mass of iron, making it occupy less space, while contraction only lessens all its superficial dimensions!

"In casting pieces of ordnance we are enabled to judge of the conjoint effects of shrinkage, contraction, and expansion.—We shall suppose that a gun mould of any given length is filled with fluid cast iron, not subject to these laws; then the size and shape of the gun, when cold, would correspond to the dimensions of the mould. But finding that the piece of casting was considerably altered, that it had shrunk interiorly, was diminished in point of length, and had lessened its diameter, we must seek for a solution of these facts, in explanation of the causes respectively."

"Frst assuming, what shall be hereafter proved by direct experiment, that cast iron occupies less volume when fluid, than when solid; that in the act of the arrangement of the molecules towards consolidation, it occupies a *larger bulk than at any other period*; and that *when cold, and in proportion to the absence of the heat, so will the volume be diminished.*"

"1st, then, shrinkage appears to be dependent upon two causes; the gravitation of the fluid metal, and the expansion of the mould. The latter, I conceive, acts a very powerful part: the immense quantity of caloric combined with the iron, is in part easily and almost instantaneously communicated to the iron box; this creates a disposition to expand, in which it is greatly assisted by the great pressure of the fluid iron." I cannot possibly see what this disposition to expand, has to do with this division of his subject; but however the iron box may be *disposed to expand*, sand being a bad conductor, no actual expansion would take place (unless in some extreme cases) while the iron was in a fluid state; and unless the box would resist the pressure of the fluid metal under all circumstances it would be entirely useless. "That portion of the metal in contact with the interior of the mould is the first to lose its fluidity, and is acted upon, and forced to give way, in the same ratio of expansion, before the more subtle and denser fluid." This is downright nonsense, for the face of the casting is formed by the metal losing its fluidity in contact with every part of the mould, and if then forced to give way to the hydrostatic pressure of the more subtle and denser fluid, it must be in cracks and fisures, which of course would render the casting imperfect.

"2nd Expansion. Of the extent of this operation we may judge from the following facts:—All patterns of castings are made somewhat larger than the piece of goods is wished to be: in common cases $\frac{1}{8}$th of an inch to the foot is allowed, but in many cases the allowance will be $\frac{3}{16}$th of an inch." (A curious fact this to adduce as evidence of Mr. M.'s 2nd, or law of expansion.) "In the case of the gun, therefore, the mould would be plus the allowance upon the pattern, what space are gained by beating the pattern to loose it from the sand, and all the extra space acquired by the increased volume of the consolidating iron. These, taken collectively, may amount to $\frac{1}{4}$th or $\frac{5}{16}$ths *of an inch*; and so much less will the *diameter of the gun be found when cold*, to that it would have measured at climax of its expansion." So far we have no proof of this, but a positive statement that it may amount to half an inch in the diameter of the gun; now this expansion, taking place in the same ratio in every direction, must amount to three, or even four inches in its length! Now as cannon are cast in dry sand, I would ask, under such circumstances, what becomes of the iron box? As it cannot be expected to give way in the same ratio of expansion, nothing can prevent its being *burst, by this, Mr. M's. unaccountable law!*

"3rd, contraction immediately takes place on the metal ceasing to expand: to its effects are chargeable the reduction of the increased diameter of the gun, and which seems merely in consequence of the escape of the caloric."

Thus does this nice observer of the habitudes of metal, continue to heap contradiction on contradiction, not in the *clumsy awkward manner* that some writers would have done, but with a degree of neatness, freedom, and self satisfaction peculiarly his own. He first assumes, what we shall presently examine his proof of, viz., that *cast iron occupies less colume when fluid* than *when solid*: then, that a trifling loss of caloric produces shrinkage, which *diminishes the mass*, so that *no degree of heat short of fusion* would make it occupy its former bulk of volume. He then says, a further loss of caloric just sufficient to convert the fluid metal into a solid, causes a most startling degree of expansion, varying from a 50th to a 25th of its dimensions: and then again, by the dissipation of the remaining caloric, it not only loses this immense increase of volume, but also the usual allowance of $\frac{1}{8}$th or $\frac{3}{16}$ths of an inch to the foot on the pattern; at once proving, in my humble opinion, *that the simply evolving its caloric, reduces its volume less by this allowance, plus the loosening the pattern, than when in its fluid state!*

"To prove that cast iron is denser in the fluid state, several pieces of iron may be put into a ladle, and hot fluid iron poured upon them; they will immediately rise to the surface, and expose a considerable portion of their bulk above the surface of the liquid iron. *This buoyancy diminishes*; and as the pieces of metal approach more and more to the state of fusion that exists in the ladle, they gradually sink, till they disappear entirely under the surface; they then rapidly dissolve, and form a part of the fluid iron."

This to me, is any thing but sufficient proof of the superior density of iron in its fluid state for the known and acknowledged laws of expansion, are directly opposed to the gradually sinking of the solid pieces as they get hotter and hotter: but what a decided contradiction is this to Mr. M.'s great 2nd law; indeed he must have totally forgot it when he stated that the *pieces of solid metal sank and wholly disappeared below the surface of the denser metal, at the very climax of their expansion!* The solution of this phenomena must therefore still continue to *puzzle our judgment*, and perhaps *elude our sagacity* after all.

Now to the proof of his assumption. "That cast iron occupies a greater bulk or volume immediately after it passes into the state of a solid. If a shot mould is carefully separated at a certain period after filling, a metallic crust is formed, more or less thick, which is the natural progress of consolidation, but which is at present an envelope to a considerable portion of fluid contents. In this state the expansion in the shot and mould, is nearly the same; the former is easily extracted from the under and upper parts of the latter. In about two minutes after, however, the expansion of the shot is more rapid than that of the mould, and at this period is difficult to disengage. As the heat is communicated to the mould, its dimensions enlarge, and the extraction of the shot is attended with less violent efforts. The mould is always filled by the shot till cooling has so far taken place as to reduce the shot mould to its former diameter: beyond this, however the shot still continues to lessen its bulk, so that when cold, it will be found to have left its mould by nearly $\frac{1}{64}$th part of its diameter."

This proof is of equal value with the rest, depending entirely as it does, on the solitary fact of the shot sticking in the mould at a certain period after casting. Now it appears to me, that the shot, instead of *always filling* the mould, as above asserted, can

only be said to do so at two definite periods: first, while every particle of the metal continues fluid; which will only be until the mould carries off so much heat as to reduce the fluid metal in immediate contact with it, to the *state of a solid*, and this operation is attended with a certain amount of contraction, as is fully proved by the shot at this moment freely leaving the mould; and second, at this moment expansion proceeds in opposite directions, for the mould begins to expand with the first increment of heat it exhibits, but until this heat is diffused throughout its whole mass, the expansion can only tend to lessen its internal dimensions: the caloric contained by the still fluid part, is at the same time given out, and is freely taken up by the crust with which it is enveloped, causing its expansion as a solid, in a ratio commensurate with its accession of heat. Another proof, if another be still wanting, of the contraction of iron on becoming solid, may be had, by breaking a common shot, when the centre of it will be found spongy, which could not be the case if any expansion had taken place.

I remain, Sir, Yours respectly,

TREBOR VALENTINE.

Derby, April 6th, 1837.

CEMENTS FOR CISTERNS, &c.—Common rosin 30 pounds, melt it and take off the scum, then add very fine yellow sand 45 lbs., Spanish Brown 2 lbs., mix the whole thoroughly with an iron shovel or other instrument.

DYNAMOMETRIC CHECK.—A committee of the French Institute, composed of Messieurs Arago, Dulong, and Poncelet, has gone through a series of experiments on the "dynamometric (or power measuring) check," an instrument invented by Prony, and lately improved by M. de Saint Leger, mining engineer at Rouen, for the purpose of measuring with accuracy the power of steam-engines and the quantity of fuel they consume. A large party of members of the Institute and the Chamber of Deputies, of professors, engineers, &c. was present at the investigation, which took place on the 10th of March at the machine manufactory of M. Pauweis at Paris. The object of the experiments was to ascertain the practical exactness of the apparatus, and for this purpose a steam-engine of twelve-horse power of M. Pauwei's manufacture was made use of. The result appeared to be perfectly satisfactory, and the scientific world now waits, with some interest, the report of the committee of the Institute. This new invention may, perhaps, supply M. Arago with less disputable grounds for claiming for his countrymen a share in the honor of improving the steam-engine, than he has been able to supply in his two disingenerously national essays on the subject in the French *Annuaire* for 1828 and 1837.—[London Mechanics' Mag.]

Agriculture, &c.

From the New-York Farmer.

The following communication should be read, and practised upon, by every man in the Union who *keeps a sheep*. It establishes beyond controversey, the importance of sheltering them during winter—and furnishes the proof in a shape not to be questioned. Our readers will, we are sure, unite with us in an expression of thanks to the intelligent writer for what he *has* given us, and a request that he will pursue the subject, as his avocations will permit, until he shall have convinced the unbelieving, and effected a reform in this important branch of husbandry.

THE MANAGEMENT OF SHEEP.

No. III.

MESSRS. EDITORS.—I am happy that my communications are acceptable to you. I have not exhausted the above subject, and shall therefore continue it. But, if I had anticipated proceeding thus far, I would have endeavored to have treated the subject a little more methodically. However, farmers are not practised in arranging their thoughts for the press, and this, in a measure, must constitute my apology for any want of order or method. For all my facts and deductions, thus far, I have drawn solely upon my own experience, and what has fallen under personal observation, and for the present, shall continue to do so.

As my principal aim has been, to direct attention to the vast importance of protecting sheep during the winter, and having but one more point to dwell upon, I will so far recapitulate as to name the advantages resulting therefrom, and which my experience has fully confirmed, viz., *saving of life—prevention of disease—and the improvement of the quality of fleece.*

I am highly gratified in being able now to add one more, and especially in a pecuniary point of view, of the highest importance, viz:—*increased weight of fleece.*

All my sheerings previous to that of '36, my sheep have yielded, only, from 2 lb. 7½ to 2 lb. 9 oz. per head. This variation, I discovered, was to be attributed to no other cause than the difference of winter seasons, being colder or milder. When the latter, an increased weight of fleece was a certain consequence. The winter of '36 my sheep were duly protected, and the yield was an average of 2 lb. 10½ oz. per head, notwithstanding, 300 of the flock were yearlings, which, all wool growers are aware, on account of deficiency of size, yield but light fleeces. But this so much exceeded any former yield, I was well persuaded it was to be ascribed to *warm shelters*. I forbore, however, to mention this in my last communication, prefering to wait until the present clip was off, but fully confirmed in the belief that my hopes would be realized of an increased average weight beyond that of last year. I am happy to say, that my hopes were well founded, and have been more than confirmed. The number of my flock, sheared, amounted to 1751, and the entire product is 5082 lbs., making an average of over 2 lbs. 14 oz. per head. With all those, doubtless, who are inexperienced in growing of fine sheep, this may seem not an extraordinary yield;—but those who are, know that it is, and, that fine fleeces, and light, go hand in hand. At all events, taking into view, the *same number* of sheep, with the *same proportion* of *yearlings*, viz. 470, and the *quality of wool*, of which some judgement can be formed from the price it has commanded n the Boston market for cash, and stated in a former communication—I challenge any wool grower, either in the State or out of it, to go beyond it.

But, a few words here as regards the weight of fleece of Saxony sheep, in general, may be considered in connection, as apposite.

I have been informed by Maj. Grant, of Walpole, N. H. who has as fine, if not the very finest flock of Saxons in the United States, that the average weight of his clips is but 2½ lbs., and some years is scarcely beyond 2¼ lbs per head. As regards the flock of Mr. Grove, of Hoosack, which is exquisitely fine, it appears from a statement of his, that the average of his sheep is nearly, or full 3 lbs. Considering the quality of his wool, it is a most extraordinary product. But the system of management, of those gentlemen, is perfect. Their sheep are closely housed during winter, and if I mistake not, are not exposed *at all*. In this particular I differ from them;—a space of some 8 or 10 feet wide is always open to admit of mine going in, or out, at pleasure. I now call upon the doubtful and sceptical, to appeal to these gentlemen, and all others, whose system of management are similar, and ascertain what would now be the condition of their flocks if they had not been adequately protected, and also to decide the point I have endeavored to maintain, viz: whether protecting sheep will, or will not increase the weight of fleece. I will pledge myself to say a unanimous affirmative will be the answer.

But the allusion to the above gentleman, and the remarks connected, is only for the purpose of setting the inexperienced right in regard to the general weight of fleece of fine wooled sheep;—what has been written will answer as a reference, although rather a digression from my subject.

In order to save your readers any trouble, I will get at the *cream* of the advantage of sheltering sheep, so far as increase of fleece is concerned, by figuring out my own gains, and most sincerely do I hope the time will not be distant, when theirs will be likewise. With the same management of their flocks throughout the year, I will guarantee the result will be the same.

I have already stated that when my sheep were exposed, the highest average yield was 2 lbs. 9 oz.,—the winter of '36 my sheep were sheltered, and the yield per head of that year, was 2 lbs. 10½ oz. Here then was a gain in the aggregate of 141 lbs. producing the snug little sum, at the price sold of $104. But the present clip comes up to the purpose exactly; the average as stated is 2 lb. 14 oz., therefore giving an aggregate gain of 547 lbs., and peradventure my wool sells at prices of last year, would produce the sum of $400.

And now Messrs. Editors, I have done with this branch of sheep husbandry. I have developed my private affairs not a little, in order to furnish proofs of the great advantages to be derived from affording adequate protection to sheep during the winter season. I have not only urged the importance of attending to the subject on the score of humanity, but leave it, scattering dollars and cents in the path I have marked out, which only needs to be followed, to find and gather up.

I shall endeavor in my next, to expose some of the sins of omission and commission in washing and shearing of sheep. M.

LANSING, TOMPKINS CO. N. Y.

CITY, STREET, AND FILTH POLICE,

We published in our last number, a communication and letter in relation to *Night Soil*. We have since received from the Editor of the Farmers' Register, EDMUND RUFFIN, Esq., in reply to a letter addressed to him for information on the subject, the following important article, which he was *then* preparing, for that valuable publication, which he has raised mainly by his own untiring efforts, and for which VIRGINIA is more indebted to him than she would be if he had lead armies to victory.

The present depressed state of every kind of business, and the importance of improving the agricultural condition of our country, has induced us to investigate the *value and mode of preparing* this rich and valuable manure—and it is our intention *to pursue the subject until a fair experiment is made of its value, as compared with the best manures now in use in this country*; and if possible to effect an entire change in the mode of disposing of the vast quantities now wasted, and *worse* than wasted, in *this* and *other* large cities,—we ask therefore, of those Editors with whom we exchange, and our readers especially, the favor of such information as they may possess, in relation to its *preparation* and *use*. Its general use in the vicinity of large cities, will certainly be productive of much good, in the *reduction* of the *price* of *vegetables*—but more especially in *cleanliness* and *health*. Every individual in community is more or less interested, either on the score of health, or economy, and we are sure that *reason* will take the place of *prejudice* in a matter of so much interest.

We have omitted No. 1, or the *first* of these valuable papers, not, however, from any want of concurrence in its reasoning, but for the purpose of coming directly to that part of the subject which relates more especially to *cities* and large *towns*.

From the forth-coming Number of the Farmers' Register.

No. II.

THE POLICE OF FILTH IN TOWNS, AND ITS BEARINGS ON COMFORT, DECENCY AND HEALTH.

The delightful season of opening summer has arrived, and the face of the earth, as formed by nature, and not deformed by man, is seen in its fairest aspect and brighest colors. Every thing shows life, in youth and beauty, and nothing yet exhibits indications of decay. Every feature of the natural landscape, in every region however varied, is beautiful to the eye. The most barren and worthless of our lands, though the most wretched in appearance after cultivation, before being touched by man, are covered with magnificent forests. Nature has not made a scene that is displeasing to the eye; and even this granite region, barren and unsightly as much of it now is, was once one wide scene of universal beauty. It is man that wastes the beauties and blessings of nature, and deforms and defiles whatever he touches.

The opening of summer in our towns, presents a very different aspect, and is accompanied with very different associations. It is true, that some beautiful gardens are seen, in which the hand of man (or more generally of woman) has improved on nature, by bringing together, in numbers, nature's choicest ornaments. But these are exceptions to the general appearance. The broad sloppy flats, receptacles of collected rain water and oozes from hill-sides, which during winter and spring merely barred the way of walkers, or, at worst, gave them wet feet, and colds and pleurisies, now are drying up, without the Corporation being put to the cost of the small amount of ditching that would have kept the ground dry at all times. A "green mantle" overspreads the standing pools—and all will soon become a naked, ugly, and foul-scented mud. The thickly settled and commereial parts of towns may, perhaps, have nothing visible worse than men and merchandize, brick houses, and paved streets; but all the out-skirts and vacant places are full of abominations to cleanliness and health, and of offence to the nostrils as well as to the eyes. The commencement of warm weather gives activity to decomposition, and the soft air is redolent of its products: and in sundry different spots of every town, the effluvia arising from filthily kept yards, of stables and hog-styes, of privies—and sometimes the breezes tainted by a dead cat, or, if without the suburbs, by carrion of larger kind—are offered to our sense of smelling, in doses of various degrees of intensity, and in every variety of combination. We become accustomed by the habit of endurance to these, as to all other evils, and in time, are scarcely conscious of the magnitude of the nuisance. But its offensiveness is estimated at the true value, by visiters fresh from the pure air of the country.

Now approaches the time when the Police, and the Board of Health will begin to bestir themselves to abate nuisances of this kind, but in such a way as to effect no manner of benefit.—Their operations merely consist in moving decomposing matter, or its sources, from one spot to another, there to proceed as before—and by thus moving and dispersing filth, to hasten its decomposition still more, though rendering its products less evident by their being more widely diffused. But the total amount of the production of such effluvia is not the less in quantity, nor the less hurtful, because, by being more wide-spread, and diluted, and by contaminating more of the atmosphere, the scent is less concentrated and offensive. All the operations of the most industrious and zealous Board of Health do not lessen the amount of decomposition within the limits of a town, unless the putrescent matter is actually thrown into and floated away by a rapid river, or otherwise conveyed away to poison the air some where else, where there may be fewer people to breathe of it. Every removal, and exposure of new surfaces, serve, only to quicken the progress of decomposition.

It is not a little remarkable that this general state of filthiness is caused and maintained, in a great degree, by the fastidious or squeamish nicety of our people. It is almost universally considered that it is quite too dirty a business, too offensive to the imagination, as well as the senses, to use carrion and human excrement for manure. If this silly prejudice did not operate, and if proper economy were used to collect, preserve, and apply these rich and most decomposable substances, the profit which they would bring as manure, would far more than pay for the expense of the proper procedure to preserve the matters, and at the same itme to maintain cleanliness. But it is not only that the contents of privies are suffered to accumulate, because of their being no profitable demand for them, (as exists in countries where the worth of manure is better understood,) but there is that want of accommodation in the number and situation of privies, which operates

to the injury of comfort, of decency, and in many ases, directly as well as indirectly, to the injury of health. We are so exceedingly nice, or proud, that we desire to conceal the existence of such humiliating necessities of our nature; and no conveniences for the purpose are provided, and kept in proper order for public use: and the privation is a matter of extreme inconvenience to all decent visiters, to a town, who have not acquired a knowledge of, and a right to use, some such places. The same morbid feeling of shame, that prevents on the one side the accommodations being afforded, also prevents on the other any complaint of the want of them. But the ground for complaint does not the less exist—as every countrymen can testify, and even every townsman, when visiting another town than his own. So nice and squeamish are our people on such subjects, that to treat of it by word or writing, would be considered by very many as both ridiculous and offensive; and when one ventures still farther, as I shall do, to recommend modes of removing the nuisance, and converting it to profit, there is much ground to expect that nothing will be excited, except a sense of the ridiculous in some, and a feeling of disgust in others. But I have never been deterred from urging what was deemed highly expedient, by the dread of being laughed at, and as to exciting disgust, it is just what is desired, provided it can be directed against the habits which are held up to condemnation.

In large cities, necessity has compelled the adoption of means to get rid of excrementitious and other filth, by a general system of sewers, or subterranean passages, into which all such matters are thrown, and by the flowing of water through, in abundance, they are washed into the adjacent river. The sewers of some great cities have been constructed on a plan so vast, and at so much expense, and were so excellent in their operation, that they have been considered as not less worthy of admiration than their magnificent temples and palaces. If the only object was to cleanse the town, and there was sufficient command of water, and of money, there could be nothing to object to this plan. Certainly the expense of constructing the sewers would be an objection not worth notice, when compared to the value of their intended effect. But if the system were not perfect, and the supply of water always abundant, the evil would be made so much the greater by being concealed from observation. There is another objection to this plan, in its contaminating and corrupting the waters of the rivers into which the sewers empty; and it may well be doubted whether water so defiled, does not itself throw off deleterous effluvia, and is not rendered more liable to cause decomposition in whatever decomposable matter it may reach: and thus that the waters are not only made to stink, but also to poison those who have destroyed their purity. But the greatest objection to this plan, is the utter destruction of so enormous an amount of rich manure, which if properly preserved and applied, would soon make rich and fruitful the poorest surrounding country.—And to properly accumulate and preserve all this manure, and prevent its being offensive to the senses, or injurious to health, might in most cases, (and certainly on all the eastern coast of the southern States,) be effected not only at less cost than by a proper system of sewers, but at less than the present wasteful and expensive system of employing laborers, under direction of the town police, and boards of health, so to stir up and move about the excrement, as to produce its most speedy decomposition, and total passing off into the air, and thereby to give the full benefit of its evolving effluvia to the nostrils of the towns-people.

The remedy is that which has been proposed in general terms in the preceding part of these observations, to provide *calcareous earth* (either marl, or whatever other form may be cheapest,) enough to cover every spot in the town, in which decomposable filth can accumulate; and this to be renewed from time to time, as needed. The calcareous matter would form a chemical compound with the putrescent, so as to preserve the latter from all waste, and from giving out any offensive odor; and once a year (when in situations not convenient at all times,) and in cold weather, the accumulations might be removed to the country to be used as manure; and the richest as well as the most permanent manure in the world, this compound of animal and calcareous matter would be.

The object would be to *accumulate*, as much as possible, instead of *dispersing*, the most putrescent matters. And for this purpose, as well as to afford the general accommodations now so much required for comfort and for decency, and also for health, there should be large and well constructed privies erected in suitable situations, and at convenient distances apart, throughout the town, free for the use of all males without exception. The pits should be large and sufficiently deep, but accessible to carts, to bring marl, and to remove the contents.—At the expense of the town (as the whole system ought to be,) there should always be kept a heap of rich marl near to each pit, and a sprinkling, once or twice a day, over the excrement, would effectually secure it from wasting, or being offensive.—By such places of accommodation being furnished, and kept in the neatest condition by regular attendants, there might be, and would be abated many of the small private receptacles, which necessarily (as now managed) are more or less filthy nuisances. And the *buckets* which now are at night emptied on all vacant and forbidden spots, (and requiring the unceasing activity of the Police and Board of Health to attempt to prevent,) would be then emptied into these pits, with certainty, simply because they would offer the nearest and most convenient places of deposite. There would then be no inducement remaining for the defiling of every spot of vacant ground; and such places, instead of being abominations to the senses and the minds of all decent observers—and absolutely forbidden to the footsteps, and even to the distant view of modest women—would be clean and lovely grass plots, serving to refresh and relieve the eyes tired of seeing brick walls and stone pavements. I will touch but gently on the *moral* nuisance that exists in so many cases in every town, where these vacant spots, the only public places "of ease," are overlooked by the back windows of the houses of respectable families, the members of which, though at considerable distances, are nevertheless unavoidably subjected to witness indecent exposures, still more offensive to the mind than to the eye.

In addition to the public and general accommodations proposed, there should be a certain and sufficient quantity of marl carried at certain intervals of time, to every private lot, (unless the occupant took measures to provide himself with it,) to be used as wanted, for similar purposes. This would prevent, what is almost impossible now to avoid, there being offensive accumulations, or still more offensive removals and dispersions, of fœcal matter on private lots.

It would be impossible to approach the truth in estimating what would be the expense of such a system in any particular town, until it shall have been tried. But there can be no doubt but that the benefits would far overbalance the cost. Many expenses and evils, much worse to bear, and now continually encountered, would be, by these means, avoided. Such of these as bear on private individuals, I pass over without notice. For one item, the public would save all that part of the labors of their police, which is now most unprofitably devoted to this object.

But even if it is admitted that the means proposed would be as effectual as I imagine, in preserving cleanliness, and cutting off sources of disease—and that the compound formed is of all the supposed value as manure, still it may be objected that it would be long before prejudice and incredulity will be so removed as to make this manure an article of sale—and consequently, that all expectations of returns from sales must be visionary. Even if there should be no sales for two or three years and if the manure should be merely taken for the trouble of carrying it away, the expense would be well afforded as a mere matter of police. But two years' use would make manifest the value of this compound manure, and the demand and the price would afterwards gradually increase, until it would nearly or quite defray the whole expense of the plan.

But the town of Petersburg has at once the best possible customer for all that the plan would supply for some years, in the farm of the Poor House, belonging to, and cultivated at the expense of the town. To this land, now much putrescent manure is carried, removed by the Police from the town. But except in winter, or at the rare and short other periods when manure can be (or is) at once advantageously laid on the field, these supplies are heaped up for future use, and of course, rot away as rapidly as possible, and give ten times as much of their products to the air as to the soil. Besides—even if there was not necessarily this great waste from the decomposition of manure altogether putrescent, when moved and heaped in warm weather, there would be very little profit from its application. The

lands lying over the belt of granite which passes through Virginia, and which forms the falls of the rivers flowing to the Atlantic, are, naturally, among the most destitute of lime, and consequently are among the poorest and the least capable of retaining putrescent manures when applied to them. Such are the lands surrounding and within a few miles of Richmond and Petersburg, and probably all the other towns at the falls of our rivers. Particular individuals, by lavish use of the cheap and rich manure of the public stables, have highly, though but for a short time, improved some of these lands, and reaped heavy crops, and, possibly, made great profits. But still the demand for such manure by the hungry, yet wasteful soil, is continual, and if it is not frequently repeated, the original poverty soon returns. But few persons have used these means, to much extent, and most neighboring residents are satisfied that the town manure is too costly to be carted to their farms.

Yet though the richest stable manure, (richest because it is principally of animal matter,) may be bought from the tavern and livery stables at 12½ cents for the largest single horse loads' (20 to 25 bushels,) it mostly rots away in bulks in the stable yards, for want of regular purchasers even at that low price.—So it is however—from the little town manure carried to neighboring farms, the little permanency of effect of what is used, and the general impression that it is not worth using—it results that most of the lands, lying even within the short distance of a mile from the towns, are wretchedly poor, and yield but little for the support of the town, either in grain, grass, or garden vegetables for market. Indeed it may well be doubted, whether a large proportion of the population of the vicinity do not buy (or obtain otherwise) from the town, as much provision as they sell to it. This state of things has continued, with but little actual improvement, as long as these towns have stood; and it may safely be predicted, that unless calcareous manures are used to fix the otherwise fleeting value of the putrescent matters, that the general condition of things will never be much better. Is it not then strange, that with the neighboring farms so poverty stricken, the town markets should be badly supplied, and at high prices, with all the small articles of daily purchase and consumption, which, though small, make up the greater part of the comfort, and (at usual prices) cause the greater part of expense of living.

Just let the reader imagine what would be the difference in these respects, if the lands surrounding each town, for as much as six miles distance, were as rich as they well could be, and produced in abundance, clover and other grasses, a full supply of garden vegetables and other small articles for the daily markets, besides their large crops of grain and other staple products. The comforts of all the persons living in town, so far as they depend on food, would be greatly increased, while the expenses of living would be made less than at present—and yet the suppliers of the market would be better rewarded than by the present miserable system, because rich land and good farming can always undersell the poor and unproductive; and at a market generally well supplied is a more sure, and therefore a better place of sale, than where demand is irregular, and, of course, prices irregular, though often very high. It will be under such a state of improvement that market gardens and market farms will be profitably kept—and the towns will be abundantly supplied, and from their neighborhood, with milk, cream, butter, eggs, fowls, and fresh meats of fat young animals, as well as with vegetables. The surplus product of hay, grain, and other field crops, of such highly enriched districts, would make no small addition to the sales and the export trade of the towns, and would serve to increase their population, and thus furnish a still increased demand for the products of the neighboring lands. It is also probable, that if the fish, of the rivers which flow by towns, were not driven away by the filthiness of the water, that their numbers would be greater on account of the neighborhood of a town, (and the abundance of food thrown into the water,) instead of being reduced almost to nothing, as is notoriously the case. Even the shad, and other fish of passage, whose instinct strongly impels them to seek the higher waters of rivers, to deposite their spawn, are mostly deterred from passing through the flood of filthy water that a town supplies; and the people on the upper waters suffer thereby a privation, as do the townsmen by the driving to a distance the more fixed residents of our fresh water rivers.

It may however be reasonably objected, by those who have not studied the qualities of soils and manures, that too much value is counted on from the use of this proposed compound matter. It would be unnecessary here to repeat at length all the grounds on which that estimate is founded. For the amount of early and annual increase to be expected from marl on naturally poor soils, and for the permanency of its effects, I refer to the reasoning and the facts presented in the *Essay on calcareous Manures*. and also to the opinions of the hundreds of farmers in the lower Virginia who are now thus improving their lands. For the chemical power of calcareous earth in combining with, and preserving from waste, putrescent matters, I refer to the general reasoning on this head in the Essay, and the statements made in the first of these communications. As to the enriching value of human excrements, it is known in Europe and in China, that they are the richest of all. In England, it is stated in agricultural books, that two waggon loads is a sufficient dressing for an acre—probably because more at once would be hurtful to the crop.

In France, there are in operation regular establishments set up by private adventurers, for desiccating, and thus preparing for use, the products of the privies and public sewers of large cities; and sufficient profits are made to support these establishments, by selling the dried manure (*poudrette*) to the farmers. Its great richness, in small weight and bulk, makes it well suited for distant transportation, and extensive sale. From the accounts that I have read of these establishments, it may be inferred that much previous decomposition, waste of value, and extrication of offensive effluvia, must take place in the material, before it is brought to the desiccating establishment—and that both the previous and subsequent manual operations must be highly disagreeable and disgusting. Besides, the desiccation seems to be sought more by mechanical than by chemical means - and any dry pulverized earthly matter is used to absorb the fluid and make the mixture dry. There does not seem to be much choice in the earthy substances. Thus they propose gypsum, and burnt earth, and quicklime, as well as chalk, rubbish of demolished buildings, and coal and wood ashes. The first two of these substances, according to my views, would be of but little effect, acting as they do only mechanically; the quicklime, (which it seems is preferred,) would be decidedly injurious; and the mild calcareous character of the latter substances would render them, only proper for the desired results. The profit of this business in France alone, would be sufficient proof of the greater value of the far more simple, economical and effectual and cleanly plan which I recommend, and which is also perfectly in accordance with the chemical properties and action of the substances used in the compound. I annex the only known description of the French process, below, in the application for a patent by the inventor, Donat, and which was communicated, with the introductory comments, By the Board of Health of Philadelphia, to the Agricultural Society ef Pennsylvania.

(To be continued.)

From the Journal of the American Institute.

We give the following tabular view of the import of foreign wheat, from the *Courier and Inquirer*. "A large portion was American bonded wheat returned to us, and to be perfect, the table should embrace it. It presents a curious question, whether those who have sent us the werewithal to prevent a famine in the land, are to be deprived of remittances in specie, should they have so ordered it, as is frequently the case for the purposes of commerce. A combined voyage, as the mercantile phrase is, is often made up; that is, a vessels starts from a given point in Europe, with a cargo of grain, or other articles that are supposed will command a ready sale. The consignees are ordered to invest the proceeds in dollars or doubloons, and to send her to Cuba or Rio, for a cargo of sugar or coffee. How is this to be done in the present state of affairs? Send the specie we cannot, and the voyage must be defeated, and probable loss instead of gain be the result. Every way in which we can turn the question, it presents difficulty and distress; our whole commercial system is out of joint, and our country, like a bad manager of

his financial concerns, becoming in evil repute with foreign nations."

IMPORT OF FOREIGN WHEAT,
Into the City of New-York.

1835. October,	From England,	17,000 bushels.			
	Holland,	1,200—Total,		18,200	
1836. Feburary,	From England,	34,000			
	Holland,	2,000	36,000		
March,	England,		42,800		
April,	"	33,000			
	Germany,	3,000			
	Austria,	3,000	39,000		
May,	England,	17,500			
	France,	9,000			
	Holland,	4,500	31,000		
June,	England,	8,800			
	Holland,	7,800	16,600		
July,	"		8,200		
August,	"		3,600		
September,	England,	15,600			
	Germany,	1,600	17,200		
October,	England,	44,700			
	Germany,	24,700	69,400		
November,	England,	46,300			
	Russia,	3,600			
	Germany,	53,400			
	Holland,	6,500	109,800		
December,	England,	62,500			
	Germany,	51,600			
	Austria	2,000			
	Italy,	1,500			
	Holland.	2,500	120,100		
Total import for 1836,				493,700	
					511,900
1837. January, From	England	49,000			
	Germany,	75,100			
	Holland,	7,500			
	Denmark.	1,000	132,600		
February,	Germany,	76,000			
	France,	25,200			
	Holland,	8,000			
	Russia,	22,000			
	Austria,	5,100			
	Italy,	7,600			
	England	32,900	176,500		
March,	Germany,	85,200			
	England,	146,000			
	Holland,	90,600			
	France,	1,300			
	Italy,	84,800			
	Sicily,	5,400	413,300		
Up to the 19th April,	Russia,	14,000			
	England,	2,500			
	Italy,	59,100			
	Prussia,	8,000			
	Germany,	23,000			
	Holland,	28,400	135,000		
Total import to 19th April, 1837				854,000	
					1,365,900

VALUE OF THE IMPORTS,
Of wheat, Potatoes, and Coal, from all parts of the world, for the last six years.

Year.	Wheat.	Potatoes.	Coal.
1830,	$492	$9,189	$204,773
1831,	685	7,818	108,250
1832,	1,151	18,436	211,017
1833,	1,606	18,356	261,575
1834,	1,213	15,942	200,277
1835,	18,647	57,901	143,461
	$23,794	$127,642	$1,120,353
Average,	4,133⅓	21,273⅔	188,215⅓

From the Farmer and Gardener.

TURNIP CULTURE.

An opinions prevails among many judicious thinking farmers, that if turnips are got in from the 20 of August to the 1st of September, that there will be time enough left to mature the crop. In the present changed state of our seasons, we believe that either of these periods, or any time between them is entirely too late, if it be desirable to grow a remunerating crop. To be sure, if the object of the culturist simply be to raise turnips for his own table use, it may be well to delay sowing thus late; for, of a certainty, the turnips so raised will be sweeter; but wherever *profit* forms the object of the crop, the seed ought to be sown from the 15th to the 25th of July, by which, besides getting a greatly increased product, time will be allowed to resow if failures, proceeding sometimes from defective seed, and at others, from destruction by the turnip fly or grass hoppers, should occur.

From the Maine Farmer.

QUESTIONS AND ANSWERS.

What is the average crop of Ruta Baga, to the acre, on land well manured and taken care of, in Maine?

Answer. 600 bushels—each bushel weighing 64 pounds, after being well cleared of tops, dirt, and small roots. Much greater crops have often been produced; say from one to two thousand bushels to the acre, or at that rate on smaller lots.

What are they worth, ton for ton, or pound for pound, for stock, compared with good English hay, corn, potatoes, apples, &c.?

A. When properly fed out, they may save hay, pound for pound; because if given in any considerable quanties, stock may be kept in good condition, if poor hay, or even straw be added.—They are worth more than potatoes in equal weight; and as much as apples, and less liable to decay. To keep a creature in decent flesh, with hay, five bushels of Ruta Baga are equal to a bushel of meal.

What kind of stock is it best and most profitable to feed them to?

A. All kinds: horses and swine not excepted. If they refuse them at first, let them become hungry, and they will soon eat them well. I have wintered swine on them, in a raw state. They are worth for them certainly as much as potatoes—and are most excellent for sheep.

What is the cost to raise them, per bushel, compared with potatoes.

A. Much less: as they yield much more on a given quantity of land; their seed and planting cost less; their hoeing more; and their leaves pay the harvesting.

Are they not more exhausting to the land than potatoes, or most other crops.

A. They are; as much more weight is taken from the soil than by most other crops. I think no one ought to object to having a large crop, because it takes more from the soil than an inferior one; but it should be known that Indian corn will not grow well the next year after a large crop of ruta baga, as each require from the soil similar qualities.

More hereafter, in relation to Ruta Baga, from A. B.

N. B. Sow from the first to the middle of June.

THE PROSPECTS OF THE CROPS.

It affords us much pleasure to be able to record the frequent notices, published in different parts of the country, of the promising appearance of the crops, notwithstanding the cold and backward season thus far.

"The Eastern (Pa.) Whig has information that the whea fields through Western Pennsylvania, promise an abundant yield."

The Northern Pennsylvanian says:

"Luzerne, Susquehanna, and Wayne Counties, never presented, since our recollection, so pleasing an aspect. Grain, Grass, and every pariety of vegetation, have assumed an appearance hitherto unprecedented, and should no unpropitious event transpire to blight the prospects of the Farmer, abundance will crown their efforts."

The Poughkeepsie Telegraph says:

"As every thing relating to the crops excites much interest we have taken some pains to enquire of our Farmers respecting that of corn, of which an uncommonly large quantity has been planted in this county. We understand that it has come up remarkably well, that with the exception of a few pieces, it is undisturbed by worms, and is very thriving. The start is good, and if the season continues favorable an abundant crop may be anticipated.—The grass, oats and barley, are also very promising, and the crop will be abundant."

The Onondaga Standard says:

"Within the past two weeks the face of nature has put on a more smiling aspect, and promises abundant returns to the cultivators of the soil. The change extends over the whole country, from every part of which we see lively hopes expressed of a plentiful harvest."

POUDRETTE, OR NIGHT SOIL MANURE.

Measures are now in progress, and in an *advanced* state, for the purpose of preparing this valuable manure—which has done so much to improve the Agriculture of *China, France and Belgium*, and in the vicinity of *London*.

There is a vast quantity of material to be had in, and about, this city; and there is *now* to be had, on very favorable terms, the necessary *experience* in its preparation.

The necessary capital to go into the business on a proper scale is partly provided—there is, however, yet an opportunity for a few subscribers.

Those who take an interest in the commencement of the business, to the amount of $500, will enjoy superior advantages in the use of the manure, which is esteemed *more valuable* than even *Lime, Plaster*, or *Bone Manure*.

Further information will be given on application at the office of the New-York Farmer, 30 Wall-street, Basement story.

Advertisements.

☞ TO RAILROAD COMPANIES.

A PERSON experienced in the construction of Locomotive Engines (many of his Manufacture being in successful operation on important Railroads in the United States) and who is likewise thoroughly acquainted with the management of such machines, and, indeed, the entire ordeal of Railroads, is desirous of obtaining the situation of General Superintendant on some Railroad, South or West.

The most satisfactory testimonials of character and capability can be produced. Communications addressed to the Editors of this Journal, stating the location of Road, &c. will meet with prompt attention.

9t—24

FOR SALE AT THIS OFFICE,

A Practical Treatise on Locomotive Engines, with Engravings, by the CHEVALIER DE PAMBOUR—150 pages large octavo—done up in paper covers so as to be sent by mail—Price $1 50. Postage for any distance *under* 100 miles, 40 cents, and 60 cts. for any distance exceeding 100 ms.

ALSO—*Van de Graaff on Railroad Curves*, done up as above, to be sent by mail—Price $1. Postage, 20 cents, or 30 cents, as above.

ALSO—Introduction to a view of the works of the *Thames Tunnel*—Price *fifty cents*. Postage as above, 8 cents, or 12 cts.

*** On the receipt of $3, a copy of each of the above works will be forwarded by mail to any part of the United States.

AVERY'S ROTARY STEAM ENGINES.—AGENCY.—The subscriber offers his services to gentlemen desirous of procuring Steam Engines for driving SAW-MILLS, GRAIN-MILLS, and OTHER MANUFACTORIES of any kind.

Engines only will be furnished, or accompanied with *Boilers* and the necessary *Machinery* for putting them in operation, and an Engineer always sent to put them up.

Information will be given at all times to those who desire it, either by letter or by exhibiting the engines in operation in this city.

Inquiries by letter should be very explicit and the answers shall be equally so.

D. K. MINOR,
30 Wall-st., New York.

DRAWING INSTRUMENTS.—E. & G. W. Blunt, 154 Water-street, New-York, have received, and offer for sale, Drawing Instruments of superior quality, English, French, and German Manufacture.

They have also on hand Levels of superior quality at low prices.

☞ Orders received at this office for the above Instruments.

TRANSACTIONS OF THE INSTITUTION OF CIVIL ENGINEERS OF GREAT BRITAIN.

The first volume of this valuable work, has just made its appearance in this country. A few copies, say *twenty-five* or *thirty* only, have been sent out, and those have nearly or quite all been disposed of at *ten dollars* each—a price, although *not* the *value* of the work, yet one, which will prevent many of our young Engineers from possessing it. In order therefore, to place it within their reach, and at a convenient price, we shall *reprint* the entire work, with ll its enagravings, *neatly done* on wood, and issue in six *parts* or *numbers*, of about 48 pages each, which can be sent to any part of the United States by mail, as issued, or put up in a volume at the close.

The price will be to subseribors *three dollars*, or *five dollars* for two copies—*always in advance*. The first number will be ready for delivery early in April—Subscriptions are solicited.

MECHANICS' FAIR.

Notice to Mechanics, Artisans, Manu-facturers, &c.—The undersigned give notice that the first Annual FAIR of the Massachusetts Charitable Mechanics' Association will be held in the city of Boston, in September next, commencing on Monday, the 18th, and continuing at least three days.

The Association have placed at the disposal of the Board of Managers, the sum of Five Thousand Dollars, to enable them to conduct the Fair upon a liberal scale; and they hope to be able to render satisfaction to all who may feel disposed to offer articles for exhibition.

Medals or Diplomas will be awarded to the owners of all articles that may be deem-ed worthy of such distinction; and the Managers intend that the strictest impartiality and fairness shall be observed in the distribution of Premiums.

The Managers, in furtherance of the snbject they have in view, invite contributions, of articles from every department of industry; of choice specimens of American ingenuity and skill; rare and valuable domestic productions, natural or artificial; the delicate and beautiful handiwork of females; useful labor-saving machines, implements of husbandry, and new models of machinery in all their varieties.

Judges will be appointed to examine all articles offered, and the managers will award a gold or silver medal, or a diploma, to all articles that may be pronounced by the judges worthy of reward.

Articles intended for exhibition, must be delivered on or before Wednesday, Septem-ber 13th.

Arrangements will be made to exhibit, *in operation*, any working models that may be offered, which will render the exhibition useful and interesting, and the managers respectfully invite contributions in this branch. A careful and competent superintendent will be appointed to take chare of all models sent for this purpose.

Board of Managers.

Stephen Fairbanks,	Jos. T. Buckingham,
John Rayner,	James Clark,
William Adams,	Henry W. Dutton,
Uriel Crocker,	George Darracott,
Gardner Greenleaf,	Wm. S. Pendleton,
James L. Homer,	Charles A. Wells,
James Barry,	Henry Bailey,
Joseph Tilden,	Jonas Chickering,
Ephraim Harrington,	Henry H. Barton,
Joseph Lewis,	Thomas Boyd,
Walter Frost,	Wm. Uunderwood,
Thomas J. Shelton,	George G. Smith,

John G. Rogers.

P. S. For any further information ad-dress JAMES L. HOMER, Corresponding Secretary, Boston.

Boston, March 24, 1837. m28–ts1

TO CONTRACTORS.

JAMES RIVER AND KANAWHA CANAL.

THERE is still a large amount of mechanical work to let on the line of the James River and Kanawha Improvement, consisting of twenty locks, about one hundred culverts and several large aqueducts, which will be offered to responsible contractors at fair prices.

The locks and aqueducts are to be built of cut stone.

The work contracted for must be finished by the 1st day of July, 1838

Persons desirous of obtaining work are requested to apply at the office of the undersigned, in the city of Richmond, before the fifteenth of May, or between the fifth and the fifteenth of July.

CHARLES ELLET, Jr.
Chief Engineer Jas. Riv. & Ka. Co.

P. S.—The valley of James River above Richmond is healthy.

16—10t

PATENT RAILROAD, SHIP AND BOAT SPIKES.

*** The Troy Iron and Nail Factory keeps constantly for sale a very extensive assortment of Wrought Spikes and Nails, from 3 to 10 inches, manufactured by the subscriber's Patent Machinery, which after five years successful operation, and now almost universal use in the United States, (as well as England, where the subscriber obtained a patent,) are found superior to any ever offered in market.

Railroad Companies may be supplied with Spikes having countersink heads suitable to the holes in iron rails to any amount and on short notice. Almost all the Railroads now in progress in the United States are fastened with Spikes made at the above named factory—for which purpose they are found invaluable, as their adhesion is more than double any common spikes made by the hammer.

*** All orders directed to the Agent, Troy, N. Y., will be punctually attended to.

HENRY BURDEN, Agent.

Troy, N. Y., July, 1831.

*** Spikes are kept for sale, at factory prices, by I. & J. Townsend, Albany, and the principal Iron Merchants in Albany and Troy; J. I. Brower, 222 Water street, New-York; A. M. Jones, Philadelphia; T. Janviers, Baltimore; Degrand & Smith, Boston.

P. S.—Railroad Companies would do well to forward their orders as early as practicable, as the subscriber is desirous of extending the manufacturing so as to keep pace with the daily increasing demand for his Spikes. (1J23am) H. BURDEN.

TO RAILROAD CONTRACTORS.

SEALED proposals will be received at the office of the Selma and Tennessee River Railroad Company, in the town of Selma, Alabama, for the graduation of the first forty miles of the Selma and Tennessee Railroad. Proposals for the first six miles from Selma, will be received after the first of May, and acted on by the Board on the 15th May. Proposals for the ensuing 34 miles, will be received after the 10th May, but will not be examined until the 1st of August next, when the work will be ready for contract.

The line, after the first few miles, pursuing the flat of the Mulberry Creek, occupies a region of country, having the repute of being highly healthful. It is free from ponds and swamps, and is well watered—The soil is generally in cultivation, and is dry, light and sandy, and uncommonly easy of excavation.—The entire length of the line of the Selma and Tennessee Railroads, will be about 170 miles, passing generally through a region as favorable for health as any in the Southern Country.

Owing to the great interest at stake in the success of this enterprise, and the amount of capital already embarked in it, this work must necessarily proceed with vigor, and I invite the attention of men of industry and enterprise, both at the North and elsewhere to this undertaking, as offering in the prospect of continued employment, and the character of the soil and climate, a wide and desirable field to the contractor.

Proposals may be addressed either to the subscriber, or to General Gilbert Shearer, President of the Company.

ANDREW ALFRED DEXTER, Chief Engineer
Selma, Ala., March 20th, 1837. A 15 tf

ROACH & WARNER,

Manufacturers of OPTICAL, MATHEMATICAL AND PHILOSOPHICAL INSTRUMENTS, 293 Broadway, New York, will keep constantly on hand a large and general assortment of Instruments in their line.

Wholesale Dealers and Country Merchants supplied with SURVEYING COMPASSES, BAROMETERS, THERMOMETERS, &c. &c. of their own manufacture, warranted accurate, and at lower prices than can be had at any other establishment.

Instruments made to order and repaired. 14 1y

FRAME BRIDGES.

THE undersigned, General Agent of Col. S. H. LONG, to build Bridges, or vend the right to others to build, on his Patent Plan, would respectfully inform Railroad and Bridge Corporations, that he is prepared to make contracts to build, and furnish all materials for superstructures of the kind, in any part of the United States, (Maryland excepted.)

Bridges on the above plan are to be seen at the following localities, viz. On the main road leading from Baltimore to Washington, two miles from the former place. Across the Metawamkeag river on the Military road, in Maine. On the national road in Illinois, at sundry points. On the Baltimore and Susquehanna Railroad at three points. On the Hudson and Patterson Railroad, in two places. On the Boston and Worcester Railroad, at several points. On the Boston and Providence Railroad, at sundry points. Across the Contoocook river at Henniker, N. H. Across the Souhegan river, at Milford, N. H. Across the Connecticut river, at Haverhill, N. H. Across the Contoocook river, at Hancock, N. H. Across the Androscoggin river, at Turner Centre, Maine. Across the Kennebec river, at Waterville, Maine. Across the Genesse river, at Squakiehill, Mount Morris, New-York. Across the White River, at Hartford Vt. Across the Connecticut River, at Lebanon, N. H. Across the mouth of the Broken Straw Creek, Penn. Across the mouth of the Cataraugus Creek, N. Y. A Railroad Bridge diagonally across the Erie, Canal, in the City of Rochester, N. Y. A Railroad Bridge at Upper Still Water, Orono, Maine. This Bridge is 500 feet in length; one of the spans is over 200 feet. It is probably the FIRMEST WOODEN BRIDGE ever built in America.

Notwithstanding his present engagements to build between twenty and thirty Railroad Bridges, and several common bridges, several of which are now in progress of construction, the subscriber will promptly attend to business of the kind to much greater extent and on liberal terms. MOSES LONG.

Rohester, Jan. 13th, 1837. 4—y

ALBANY EAGLE AIR FURNACE AND MACHINE SHOP.

WILLIAM V. MANY manufactures to order. IRON CASTINGS for Gearing Mills and Factories of every description

ALSO—Steam Engines and Railroad Castings of every description.

The collection of Patterns for Machinery, is not equalled in the United States. 9—1y

NEW ARRANGEMENT.

ROPES FOR INCLINED PLANES OF RAILROADS.

WE the subscribers having formed a co-partnership under the style and firm of Folger & Coleman, for the manufacturing and selling of Ropes for inclined planes of railroads, and for other uses, offer to supply ropes for inclined planes, of any length required without splice, at short notice, the manufacturing of cordage, heretofore carried on by S. S Durfee & Co., will be done by the new firm, the same superintendant and machinery are employed by the new firm that were employed by S. S. Durfee & Co. All orders will be promptly attended to, and ropes will be shipped to any port in the United States.

12th month, 12th, 1836. Hudson, Columbia County State of New-York.

ROBT. C. FOLGER,
33—tf. GEORGE COLEMAN,

AMES' CELEBRATED SHOVELS, SPADES, &c.

300 dozens Ames' superior back-strap Shovels
150 do do do plain do
150 do do do caststeel Shovels & Spades
150 do do Gold-mining Shovels
100 do do plated Spades
50 do do socket Shovels and Spades.

Together with Pick Axes, Churn Drills, and Crow Bars (steel pointed,) manufactured from Salisbury refined iron—for sale by the manufacturing agents,

WITHERELL, AMES & CO.
No. 2 Liberty street, New-York
BACKUS, AMES & CO.
No. 8 State street, Albany

N. B—Also furnished to order, Shapes of every description, made from Salsbury refined Iron v4—tf

STEPHENSON,

Builder of a superior style of Passenger Cars for Railroads.

No. 264 Elizabeth street, near Bleecker street, New-York.

RAILROAD COMPANIES would do well to examine these Cars; a specimen of which may be seen on that part of the New-York and Harlaem Railroad now in operation f25tf

TO RAILROAD CONTRACTORS.

PROPOSALS will be received, at the office of the Hiwassee Railroad Com., in the town of ATHENS, TENNESSEE, until sunset, of Monday, June 12th, 1837; for the grading, masonry and bridges, on that portion of the HIWASSEE RAILROAD, which lies between the River Tennessee and Hiwassee. A distance of 40 miles.

The quantity of excavation will be about one million of cubic yards.

The line will be staked out; and, together with drainings and specifications of the work, will be ready for the inspection of contractors, on and after the 1st day of June.

JOHN C. TRAUTWINE,
Engineer in Chief Hiwassee Railroad.
16—6t.

RAILWAY IRON, LOCOMOTIVES, &c.

THE subscribers offer the following articles for sale.

Railway Iron, flat bars, with countersunk holes and mitred joints,

							lbs.
350 tons	2½	by	½,	15 ft in length, weighing			4 68/100 per ft.
280 "	2	"	½,	"	"	"	3 50/100 "
70 "	1½	"	½,	"	"	"	2½ "
80 "	1½	"	½,	"	"	"	1 25/100 "
90 "	1	"	½,	"	"	"	½ "

with Spikes and Splicing Plates adapted thereto. To be sold free of duty to State governments or incorporated companies.

Orders for Pennsylvania Boiler Iron executed.

Rail Road Car and Locomotive Engine Tires, wrought and turned or unturned, ready to be fitted on the wheels, viz. 30, 33, 36, 42, 44, 54, and 60 inches diameter.

E. V. Patent Chain Cable Bolts for Railway Car axles, in lengths of 12 feet 6 inches, to 13 feet 2¼, 2¾, 3¼, 3½, 3¾, and 3¾ inches diameter.

Chains for Inclined Planes, short and stay links, manufactured from the E. V. Cable Bolts, and proved at the greatest strain.

India Rubber Rope for Inclined Planes, made from New Zealand flax.

Also Patent Hemp Cordage for Inclined Planes, and Canal Towing Lines.

Patent Felt for placing between the iron chair and stone block of Edge Railways.

Every description of Railway Iron, as well as Locomotive Engines, imported at the shortest notice, by the agency of one of our partners, who resides in England for this purpose.

A highly respectable American Engineer, resides in England for the purpose of inspecting all Locomotives, Machinery, Railway Iron &c. ordered through us.

A. & G. RALSTON & CO.,
28 tf Philadelphia, No. 4, South Front-st

ARCHIMEDES WORKS.

(100 North Moor street, N. Y.)
NEW-YORK, February 12th, 1836.

THE undersigned begs leave to inform the proprietors of Railroads that they are prepared to furnish all kinds of Machinery for Railroads, Locomotive Engines of any size, Car Wheels, such as are now in successful operation on the Camden and Amboy Railroad, none of which have failed—Castings of all kinds, Wheels, Axles, and Boxes, furnished at shortest notice.

4—v1f H. R. DUNHAM & CO.

MACHINE WORKS OF ROGERS,

KETCHUM AND GROSVENOR, Paterson, New-Jersey. The undersigned receive orders for the following articles, manufactured by them, of the most superior description in every particular. Their works being extensive, and the number of hands employed being large, they are enabled to execute both large and small orders with promptness and despatch.

RAILROAD WORK.

Locomotive Steam-Engines and Tenders; Driving and other Locomotive Wheels, Axles, Springs and Flange Tires; Car Wheels of cast iron, from a variety of patterns, and Chills; Car Wheels of cast iron, with wrought Tires; Axles of best American refined iron, Springs; Boxes and Bolts for Cars.

COTTON WOOL AND FLAX MACHINERY,

Of all descriptions and of the most improved Patterns, Style and Workmanship.

Mill Geering and Millwright work generally; Hydraulic and other Presses; Press Screws; Callenders; Lathes and Tools of all kinds; Iron and Brass Castings of all descriptions.

ROGERS, KETCHUM & GROSVENOR
Patterson, New-Jersey, or 60 Wall street, N. 51tf